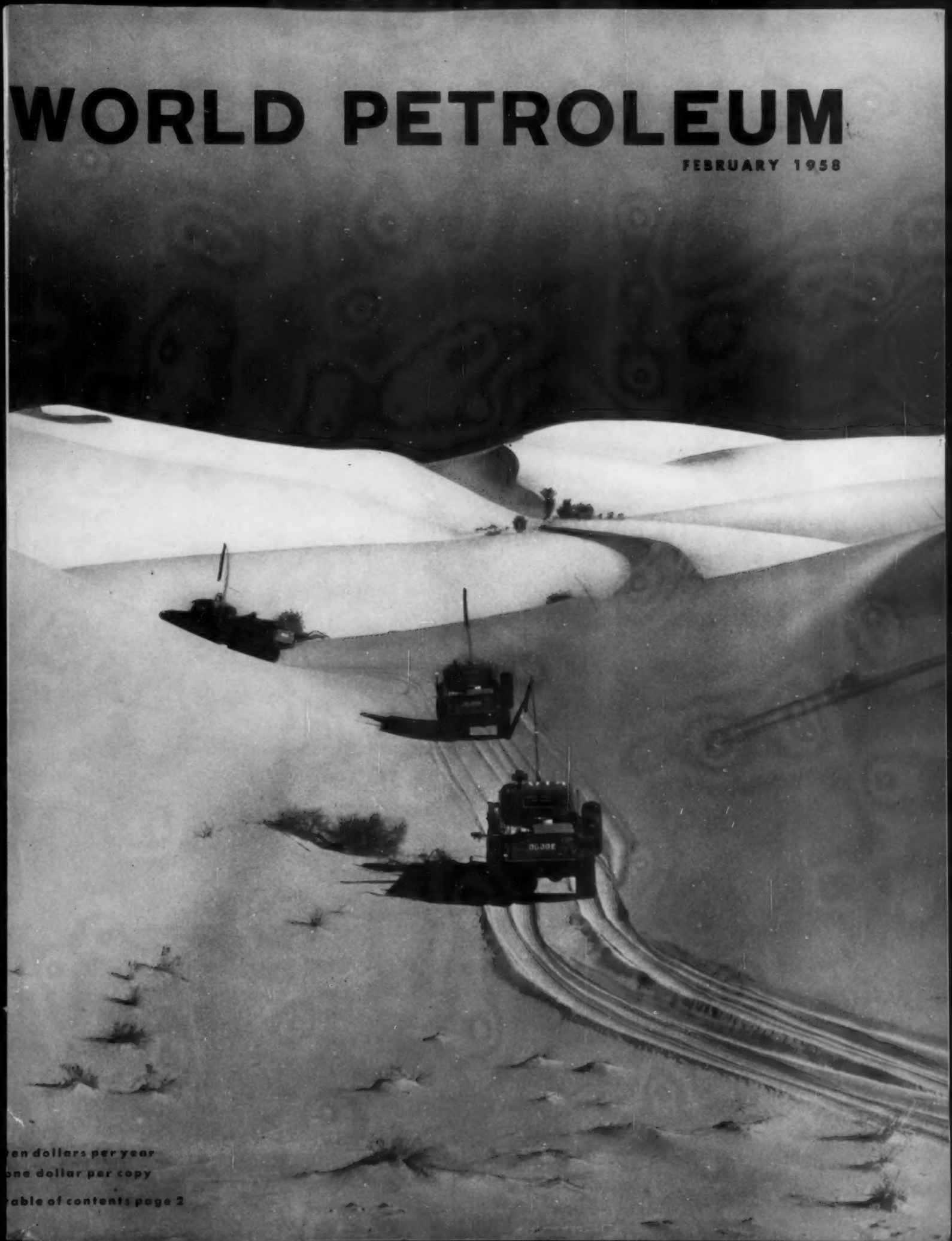
WORLD PETROLEUM

FEBRUARY 1958



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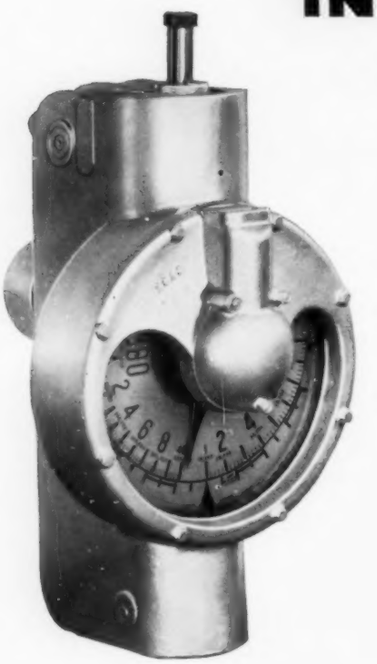

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VOL. 29, NO. 2 FEBRUARY, 1958

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

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THIS MONTH'S COVER

Arabian American Oil Co. exploration trucks skirt towering sand dunes in the Rub' al-Khali, a great desert in southern Saudi Arabia. Dunes rise 30 to 100 ft and have no predictable pattern. Often they block the movement of equipment. In the spring, crews are hampered by sand storms and intense heat forbids summer exploration. Aramco Photo.

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WORLD'S NORTHERNMOST REFINERY ON STREAM

Finland's First Refinery, Engineered by Lummus, Now Fully Operating at up to 115% of Design Capacity

Finland's new Neste Oy refinery, designed to handle a mixture of 18,500 B/D of Middle East and Russian crude oil, or 19,200 B/D of Russian crude alone, is now on stream.

Located at Naantali, near the southwestern port of Turku, the new refinery includes the following units: an electrical desalting unit; atmospheric and vacuum distillation unit; Atlantic Catalytic Reforming Unit (Catformer) with a total charge of 3400 BSD; Socony Mobil Thermofor Catalytic Cracking Unit with a fresh feed charge of 6000 BSD; California Research Corporation Catalytic Polymerization Unit to produce 500 BSD of polymer gasoline; asphalt vacuum and oxidation unit to produce 1300 BSD of paving grade asphalt. There are also the necessary units for vapor recovery, solid copper chloride sweetening and double caustic and inhibitor treating.

Under its contract with Neste Oy, Lummus provided detailed engineering, coordination of all procurement, construction supervision and extensive assistance during initial operation. Lummus also provided assistance in arranging for a broad financing scheme, set up an operator training school at the job site, and helped set up the overall refinery organization and manpower requirements.

Construction of the refinery was completed in July, 1957, with crude first introduced to the Atmospheric Unit by the end of July, 1957. The refinery was up to capacity, producing specification products within 6 weeks after start-up. Overall completion time was less than 24 months from the date when procurement areas were first definitely established.

One of the few refineries built thus far to have a fully electronic instrument control system, the new installation will meet about half of Finland's demand for petroleum products.

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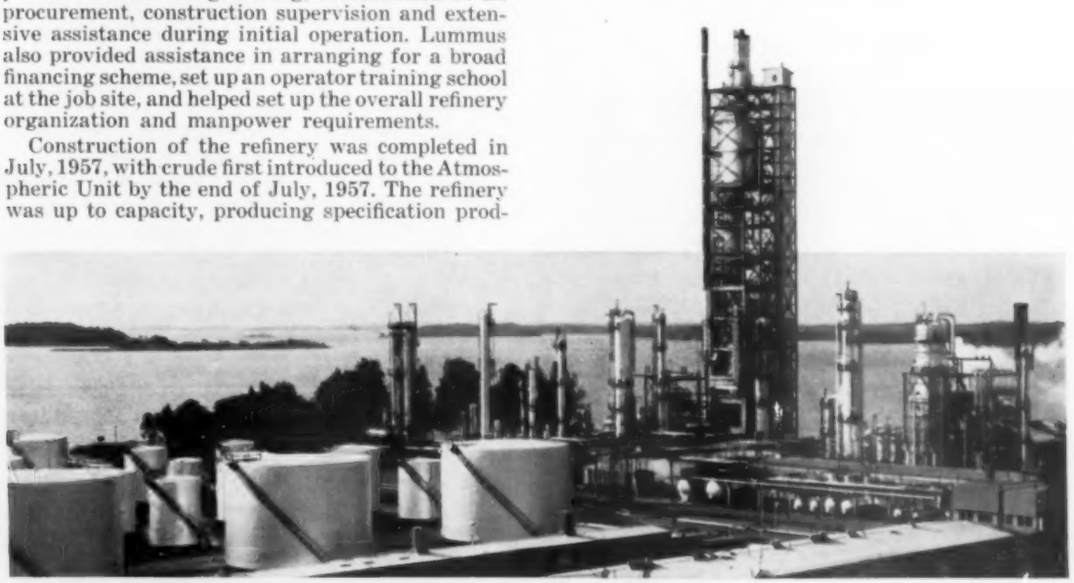

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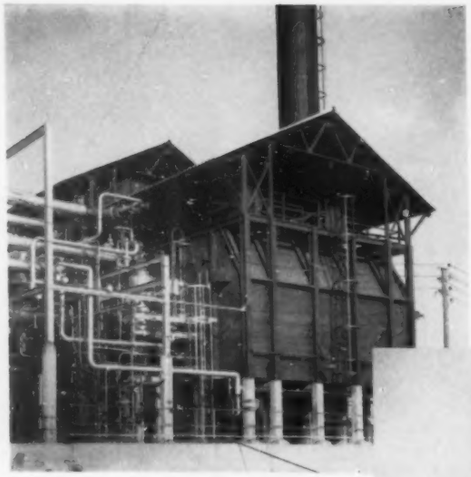
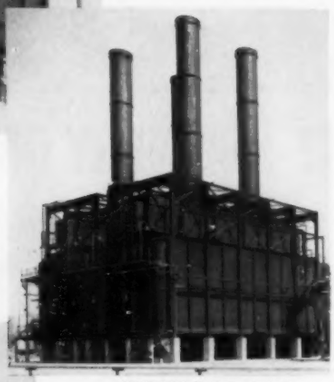
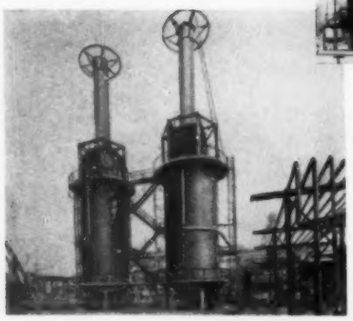


Petrochemical pyrolysis heater, France



300,000,000 Btu/hour crude heater for 100,000 B/D crude unit, U.S.A.



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CHICAGO, WASHINGTON, D.C., HOUSTON, BATON ROUGE, MONTREAL, CARACAS, LONDON, PARIS, THE HAGUE

By Joseph B. Huttlinger

The U. S. government has set up quotas for crude-oil imports to the West Coast, effective January 1, 1958. The program is to run through the first half of 1958, unless extended.

Under the program, each of the 18 companies bringing crude oil the West Coast is given a specific quota. The aggregate is 221,100 b/d compared with plans of the importers to bring in 348,800 b/d. California producers had suggested 173,000 b/d as proper.

Last summer, the government set up quotas for Eastern and Gulf Coast importers, but exempted the West Coast. Allowed crude imports under the old program are about 771,000 b/d; adding on the West Coast allowables, the total now is about one million b/d.

President Eisenhower brought the West Coast under the program by saying officially he "approved" the report of a special cabinet committee appointed under the national security amendment of the Reciprocal Trade Agreements Act. This act and the national security amendment expire this summer, unless extended by Congress. Prospects are both will be continued.

The new report of the committee states that imports proposed in the West "could have a serious effect on the domestic oil industry in District V, resulting in an eventual decrease in the rate of exploration and development as well as leading to the premature abandonment of marginal production.

"It has been concluded that imports of crude oil into District V during the first six months of 1958 should be at such a level as to make up the deficit in that area between domestic supply and demand and at the same time provide some reserve for possible increases in the latter. It is considered that crude-oil imports at an average daily rate of approximately 220,000 bbl will accomplish that objective."

The report estimated first-half demand at 1,285,000 b/d and domestic supply at 1,107,000, leaving a deficit of 180,000 b/d.

The committee explained that "The figure of approximately 220,100 b/d represents a substantial reduction from the current level of imports and a decrease of almost 130,000 b/d, or 37%, below the level programmed for the first half of 1958.

"It is realized, however, that an even greater reduction may become necessary if demand does not in fact equal or exceed estimates. In that event, the import level should be reviewed again during the second quarter of 1958 to determine what changes, if any, are warranted under the circumstances then existing."

PIPE LINE

The report set forth a three-part formula to calculate how much crude would be allowed to each of the 18 companies which import crude or plan to do so during 1958.

Finally, the report warned that all imports must be for "the direct account of the importers"; that no importer should be allowed to increase its imports through oil-sale and product-purchase agreements, by transfer of allotments, or by other means. The report saw the chance of circumvention of the plan by bringing in distilled products, and asked Office of Defense Mobilization and Department of Interior to watch this closely.

Any companies importing to the West Coast will have a chance to petition for relief of alleged inequities, the report said. Any company wanting to join the ranks of the importers must wait six months after filing a petition to do so, the report explained.

The importance given the program in Washington is indicated by the fact the White House announced the details at a press conference. James Hagerty, press secretary to the president, conducted the press conference. Captain Matthew V. Carson, Jr., crude-oil imports administrator, was on hand to answer questions.

Mr. Carson at once got off telegrams to the 18 companies asking whether they would "cooperate." He said: "I wish to emphasize that your cooperation is essential if such a voluntary program is to succeed and thus render consideration of other means unnecessary."

Canada learned of the decision "with regret."

At Ottawa, Canada, Finance Minister Donald Fleming said Canada "cannot accept the view" that curbs on imports from Canada to the USA are justified. Canada, he said, will "continue to press its objections."

Robert L. Wood, of Midland, Texas, president of the Independent Petroleum Assn. of America, said the program "provides a further basis for confidence that the government intends to effectively deal with the import problem. Domestic producers should welcome and be encouraged by this action."

Under the voluntary program, crude-oil imports to District V would be held to 220,100 b/d through June 30, 1958. Three classes of importers are set up, and a specific formula for each class is promulgated. They are:

1—Major importers, those whose imports have been more than 3,000 b/d: They are asked to bring in no more than their 1956-57 imports less 15%.

2—Smaller importers, those whose imports have been 3,000 b/d or less: They are allowed to bring in what they planned, but not more than 3,000 b/d over their 1956-57 imports.

3—New importers, those who had no imports in 1956-57: These are allowed to bring in what they planned, but not more than 3,000 b/d.

On the basis of these formulas, the allowed crude oil imports by companies work out about as follows, according to the report:

(Continued on page 68)

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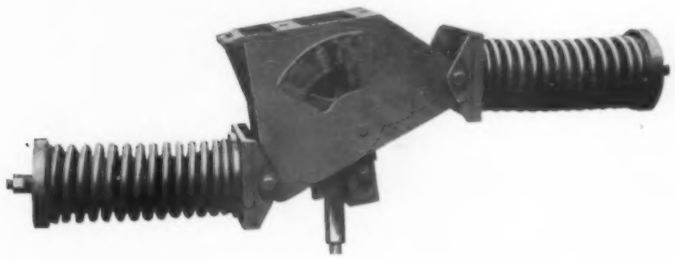

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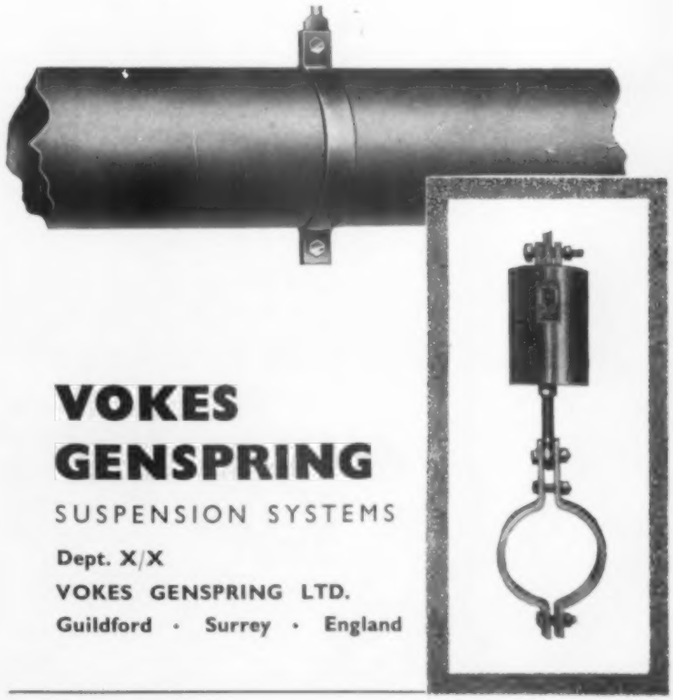

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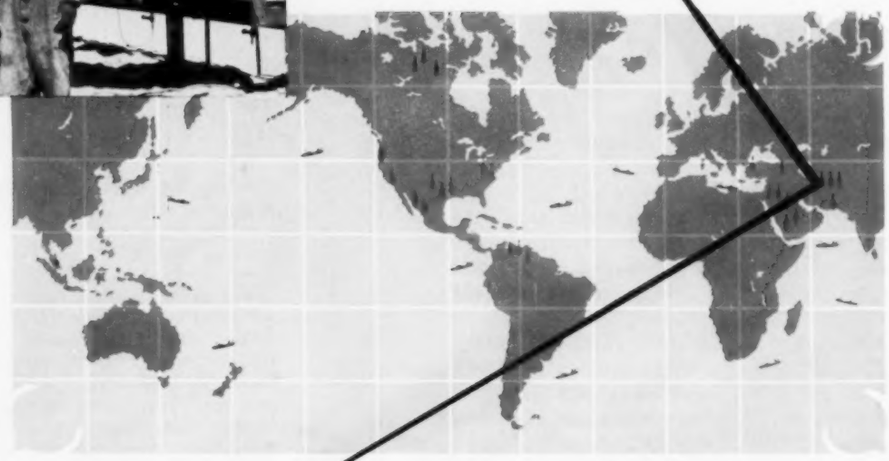

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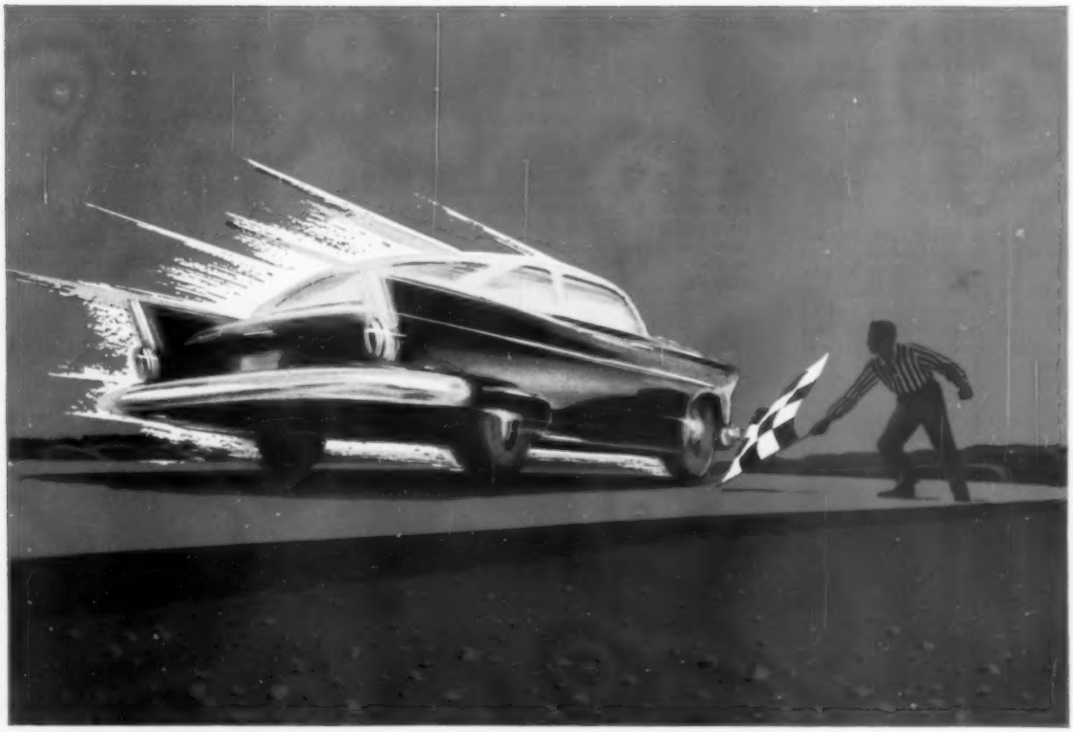

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ATLANTIC

Canadian Notes

To Spend $147 Million in 1958

M. S. Beringer, president of British American Oil Co. Ltd., reports his company will spend approximately $147 million in 1958 for exploration and development of oil and gas properties and the expansion of refinery, marketing, and transportation facilities.

Exploration and production activities include $20 million for gas-utilization projects in western Canada.

Manufacturing additions also take a large portion of this program, including the completion late in 1958 of a new 20,000 b/d refinery at Port Moody, near Vancouver. At B-A's Clarkson, Ontario, refinery a new catalytic desulfurization unit and an alkylate unit are scheduled to be built. 1958 will also see a new catalytic reformer added at the Moose Jaw refinery.

Lilley Heads McColl Frontenac

A. NEIL LILLEY has been elected president of McColl Frontenac Oil Co. Ltd., Montreal, to succeed T. C. Twyman who resigned to become senior vice president of The Texas Co., at New York. Mr. Lilley has been a director and vice president of The Texas Co. He first joined the company in 1933 in sales work on the West Coast and, after World War II, served in foreign operations in France. He returned to New York in 1949 as general manager of foreign operations in the Eastern Hemisphere, and was elected a vice president in 1951 and a director in 1954.

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Canadian Kewanee Organized

Canadian Kewanee Ltd. has been organized as a subsidiary of Kewanee Oil Co. Offices are being opened in the Airlines Building in Calgary. Lance L. Crozier is vice president of the new Kewanee company, and will direct its operations. Paul G. Arnold, formerly at Wichita, Kans., will be production manager, and Pat M. Welch office manager.

To Export 450 Mmcf Canadian Gas Daily

Alberta & Southern Gas Co. Ltd. has made formal application for a permit from Alberta Oil & Gas Conservation Board to export 450 million cubic feet of natural gas daily from Alberta. A subsidiary of Pacific Gas & Electric, San Francisco, the company now has under construction or option some 80% of the gas it proposes to export via a 1,300-mile $330 million pipeline.

Conservation Board for British Columbia

A three-member Conservation Committee has been named by the provincial cabinet of British Columbia to assist in administration of the province's growing oil and gas industry. A code of regulations is being worked out in the interests of orderly conservation of the petroleum natural resources.

The BC group differs from the Alberta Oil and Gas Conservation Board in that its members are from within the government service. They include: A. N. Lucie-Smith, chairman, a mining engineer, who joined the BC Department of Mines after having served 28 years with oil exploration firms in Venezuela and Australia; N. D. McKechnie, also a mining engineer, who was a geologist with a number of Canadian firms before joining the Mines Department in 1948; M. H. A. Glover, an economist, who serves as assistant director of the provincial Trade and Industry Department's bureau of economics.

Canada Drilling Decline Forecast

Drilling supply companies in Canada forecast a further decline in drilling activity in 1958, with probably 2,700 to 2,800 completions—down from an estimated 3,000 this year. Greater average depth, however, will hold total footage nearer the 1957 figure, as development areas will involve many wells close to 10,000 ft.

1st Deep Discovery in Saskatchewan

First deep-formation commercial discovery in Saskatchewan was made 25 miles southwest of the Weyburn oil field by Imperial Oil Limited. Ordovician oil was recovered in drill-stem tests at almost 10,000 ft in Imperial Hummingbird 6-13-2-19, 1sd 6-13-2-19W2, a wildcat in virgin territory in south-central Saskatchewan.

Canada's Gas-Export Policy Studied

Major companies in Canada are organizing a campaign for revision of the dominion government's natural-gas export policy, recently expressed as "total suspension," pending report of the royal commission on energy. Great concern of prospective United States importers and discouragement of gas-development drilling in western Canada are very sensitive points with the Canadian producers.

Safety Committee for Canada's Oil

Canadian Association of Oilwell Drilling Contractors has launched a drive to combat rising cost and number of accidents in the industry to avoid increased Workmen's Compensation Board assessment. CAODC has established a new safety committee under chairmanship of J. S. Hunter, of Hunter Drilling Ltd., in a move to achieve a reduction in accidents. The committee plans distribution of safety literature among other functions, including coordination of all oil-field safety and training.

Mobil Oil Personnel Changes

A number of promotions and transfers have been announced by Mobil Oil of Canada Ltd. D. W. Axford has been named chief research geologist for the company. Arne R. Nielson becomes chief geologist, replacing Joseph Spivak who was recently named exploration manager. R. J. Rohloff becomes geologist in charge of Mobil Oil Operations in eastern Saskatchewan, with headquarters in Regina. He replaces P. F. Brennan, district geologist, who will move to the southern Alberta district for Mobil Oil in Calgary. John L. Townley III, staff geologist, goes to New York with Socony Mobil Oil Co. Inc.

Heads Bank's Oil Department

C. A. P. LEAHEY, formerly special representative of the Bank of Montreal in Calgary, has been appointed manager of the bank's oil and gas department there.

Staff Changes

L. J. RICHARDS has been appointed senior vice president of Hudson's Bay Oil and Gas Co. He was named a vice president in 1954 and elected a director in July of this year. H. W. BLAUVELT is the other newly appointed senior vice president. Mr. Blauvelt joined Continental Oil Co. in 1952 as assistant controller, and he held that position until accepting his new appointment with Hudson's Bay Oil and Gas.

D. S. WOODMAN has been appointed assistant general manager of marketing, British American Oil Co., with headquarters in Toronto. G. W. GARTON succeeds Mr. Woodman as manager of Ontario division, with headquarters in Toronto.

H. DIX FOWLER has been appointed vice president in charge of engineering and operations for Trans-Canada Pipe Lines Ltd. In this position, he will be responsible for all phases of engineering construction and operation of the west-east line. Mr. Fowler was resident engineer on compressor-station construction for Gulf Interstate Gas Co., Houston, prior to joining Trans-Canada three years ago.

F. CLARENCE MANNING, prominent Calgary industrialist, has been appointed a director of Canadian Western Natural Gas Co. Ltd. Among his other positions, Mr. Manning is a director of Royalite Oil Co. Ltd. He also is president of Manning-Egleston Lumber Co., Ltd.

J. A. STRAND has been appointed petroleum engineering supervisor of British American Oil Co. Ltd. In his new position, as petroleum engineering supervisor, Mr. Strand is responsible for the development and execution of the company's plans and procedures respecting drilling and completion operations and field development. He assumes the position vacated by Floyd D. Aaring, recently appointed zone production manager in the Calgary production zone.

F. C. LANTZ has been appointed assistant general manager of transportation for Imperial Oil Ltd. He has been succeeded as head of the pipeline division by Bruce H. Mackenzie; and Luis Garcia, formerly chief engineer, has become assistant department manager. W. D. Archbold was transferred from the economics department to become management assistant.

S. T. REYNOLDS has been made manager of the Calgary refinery of Imperial Oil Ltd. He succeeds J. J. Hanna, retired. Mr. Reynolds was superintendent at Edmonton at the time of his appointment. He has been succeeded at that refinery by F. B. Doull, who was lube process superintendent.

S. A. BERTHIAUME has been elected vice president and manager of the Texaco Exploration Co., a wholly-owned subsidiary of The Texas Co. Operating headquarters of the company are at Calgary, where Mr. Berthiaume assumed his new duties December 1. Before his election, he was assistant to the vice president in charge of The Texas Co.'s domestic producing department.

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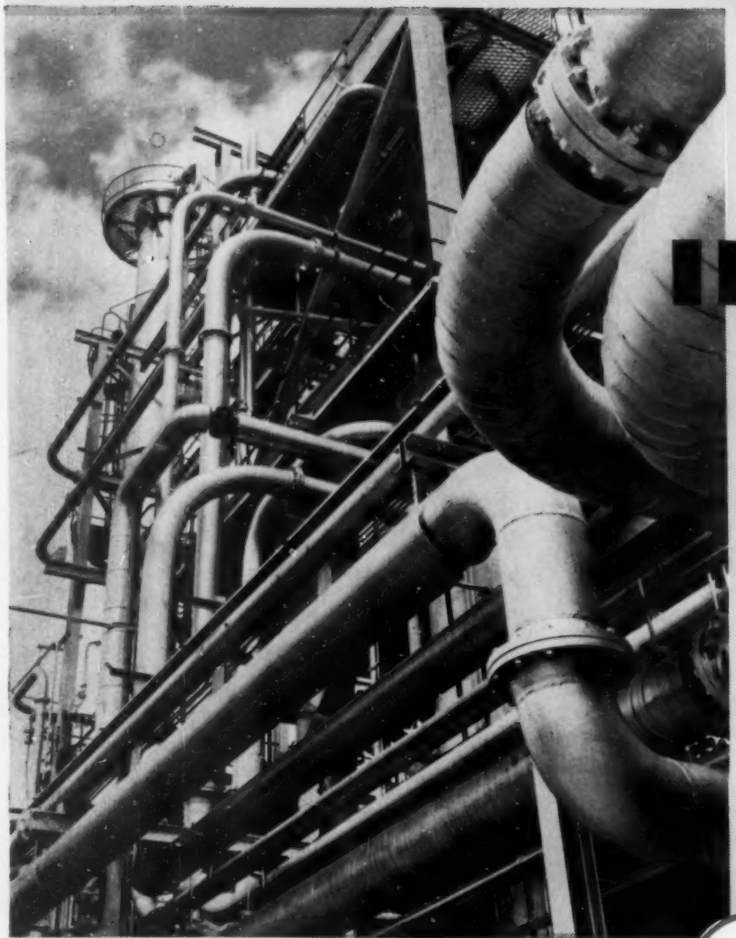

Pipelines on the Hydrocarbon Fractionation Unit, at the new Shell Chemical Plant, Stanlow, near Chester, England. (A Shell photograph).

Protecting storage tanks, pipe-lines and refineries . . . withstanding the assault of sun, sand and salt air, International Paints are subjected to every possible climatic hazard in oilfields throughout the world—and they come through with flying colours.

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Ancient and modern transportation, traveling along the same road, present a vivid and, at the same time, curiously appropriate contrast ☆ This meeting of the past and present symbolizes the rapid advance in many parts of the world from slow, laborious methods of hauling goods and equipment to swift, up-to-date means of transport ☆ Power once supplied by beasts of burden is steadily being supplanted by the more efficient power of petroleum ☆ Caltex quality fuels, oils and lubricants keep cars, trucks and tractors operating smoothly, speeding production, transportation, distribution—and bringing to the peoples of many nations a new prosperity, a new era of comfort and convenience ☆ Caltex is participating in the present and planning for the future in over 70 countries—partner in progress in Europe, Africa, Asia, Australia and New Zealand.

CALTEX

PETROLEUM PRODUCTS

Latin American Oil News

Argentina Pipeline Contract

USA construction firms have a major role in a new $180 million oil and gas pipeline job in Argentina. Yacimientos Petroliferos Fiscales has signed a contract for the work, details of which are to be made available soon. Tecnica Industrial Petrolera SA (TIPSA) has the contract. Leaders in TIPSA are Fish Engineering Co. and North American Utility and Construction Co.

The work includes: (1) a Tucuman-San Lorenzo crude-oil pipeline from Campo Duran oil field of YPF to the Parana River port of San Lorenzo, where YPF has a refinery; (2) a natural-gas pipeline system from the same field to Buenos Aires; (3) a plant for treating the Campo Duran gas to separate natural gas from other products, such as propane and butane.

One-fourth of the payment is to be made in Argentine pesos. Some 60% is to be in West European currencies; and 15% is to be in US dollars. Terms call for payment of 25% the first year; 15% the second; 25% the third; 15% the fourth; 10% the fifth; and 10% the sixth. Crédit Lyonnais and other European bankers are handling the financing. Most of the equipment imports are to come from Western Europe.

Construction is to start in April, and the job is to be completed two years later. The oil line is to have a capacity of 9,000 cubic meters and the gasline system a capacity of 2,500,000 cubic meters daily.

Argentine Concession Obtained

One of the three Argentine oil properties excluded from the petroleum law when the government took control of all of that country's oil lands has been purchased by Coney Argentina SA (CASA) as a part of a 2,300,000-acre ranch holding in Mendoza province of Argentina. The other two independent Argentine oil fields are owned by Esso and Shell.

The Sosneado Oil Co. purchased by CASA has some 13 producing wells at the present time, with further development programmed. Elsewhere on the ranch are deposits of gilsonite and asphalt in addition to other minerals such as silver, lead-zinc and iron ore, and copper.

Dutch Guiana Exploration

Surinam Corp., Houston, plans to offer one million shares of $1 a share common stock to the public to finance oil exploration and development in Surinam. Some $7,500,000 is reportedly to be spent.

A subsidiary, Colmar Surinam Oil Co., has a 40-year concession for oil, gas, and sulfur on 3,700,000 acres of Surinam, South America. Another 13,000,000 shares of common stock is held by three persons and their designees, the company said. The three are Edward J. Hanlon, Jr., of Winter Garden, Fla., who is secretary of Colmar; Prentiss H. Clayton of Orlando, Fla.; and Marts Oil Co., of Bartlesville, Okla. The three are said to have contributed $6,924,900 to Colmar Surinam. Colmar president is E. C. Loy of Houston, while Ira Brinkerhoff of Houston is director and consulting geologist.

New Maracaibo Well

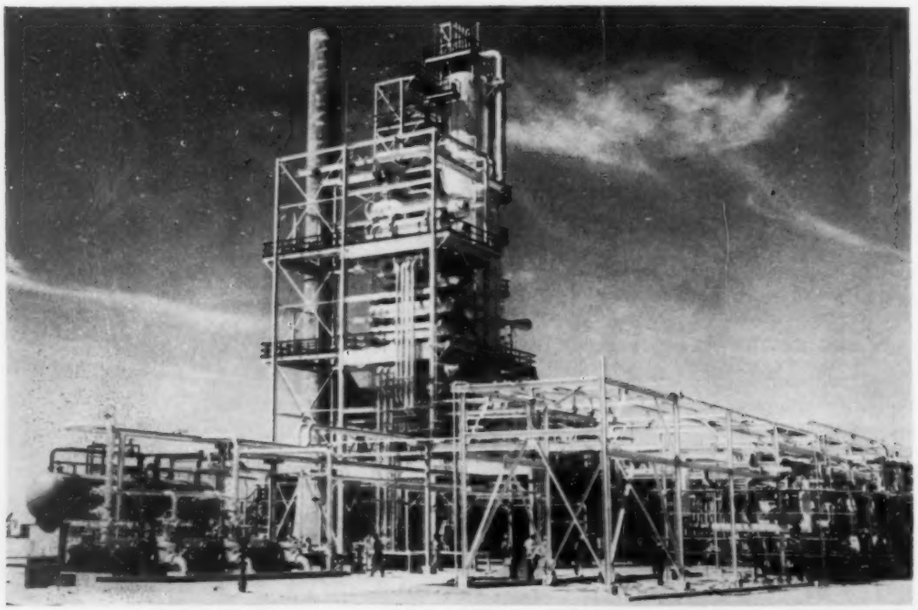
San Jacinto Petroleum Corp. has announced discovery of 5,760 b/d production in Marlago 1 well. Oil was 27.1 gravity. The well is in Block 575 of 2,000 acres. Tennessee Gas Transmission; Union Oil & Gas of Louisiana, Lion Oil, Murphy Corp., Sharples Oil and American Petrofina are participating in the well.

New Venezuela Lube Plant

Creole Petroleum Corp. announces construction of a $7,650,000 lubricating oil plant at the Amuay Refinery on the Paraguana Peninsula northeast of Lake Maracaibo in Venezuela. Completion of the plant with a capacity of 700 b/d is expected in 1958.

Costa Rica Contract Extended

Union Oil Co. of California has obtained a two-year extension of its oil exploration contract in Costa Rica, which was to have expired November 17, 1957. Cia. Petrolera Costa Rica, Union's subsidiary, signed the extension along with the Minister of Agriculture and Industries.



Completion at its Amuay refinery in Venezuela of a new crude-oil distillation plant, with a capacity of 104,000 b/d, has been announced by the Creole Petroleum Corp. It is the four such distillation plant to be built at the refinery, and brings its total capacity to 328,000 b/d.

Chile Completes 18 Wells

Eighteen wells were completed in Chile in 3rd 1957 quarter. Eight were dry; 11 gas; six oil. Meters drilled came to 38,199.5. Breakdown by months: July, 10,732; August, 12,846.5; September, 14,621. Crude production for the quarter was 1,103,431 bbl; natural-gas output, 192,478,000 cubic meters.

Venezuelan Completions

A total of 1,319 wells was completed in Venezuela in the first 9 months of 1957—some 391 of them in the 3rd quarter of the year. Shell group was leader—with 486; followed by Mene Grande—with 318; and Creole—with 159. Last was Phillips—with four. Shell had three dry holes, and brought in oil in 483 development wells. Mene Grande found oil in 14 wildcats, as well as in 292 development wells, and had 11 dry holes in all. Overall, oil wells added up to 1,186 development and 37 wildcats. Gas was found in three developments; and dry wells totaled 50 for development and 43 for wildcats.

New Gas Field For Mexico

Natural-gas pipelines are under study in Mexico with discovery of a new gas field some 40 miles west of Nuevo Laredo.

Venezuelan Wildcat Discovery

A 300 b/d producer at Pedernales has been brought in by Atlantic Refining Co. The wildcat, No. 2-A Capure, is on a 36,500-acre tract held equally with Seaboard Oil. Production was from 1,848 to 1,860 ft. Oil was 22 API.

Trinidad Offshore Wildcat

Dominion Oil Ltd., a Socal subsidiary, is drilling a stratigraphic test, Couva Marine 1, about 4½ miles off the coast of Trinidad and 13 miles south of Port of Spain. An 8,000 ft. rig is being used with the new floating technique similar to that used by the CUSS group.

Cuban Refinery Onstream

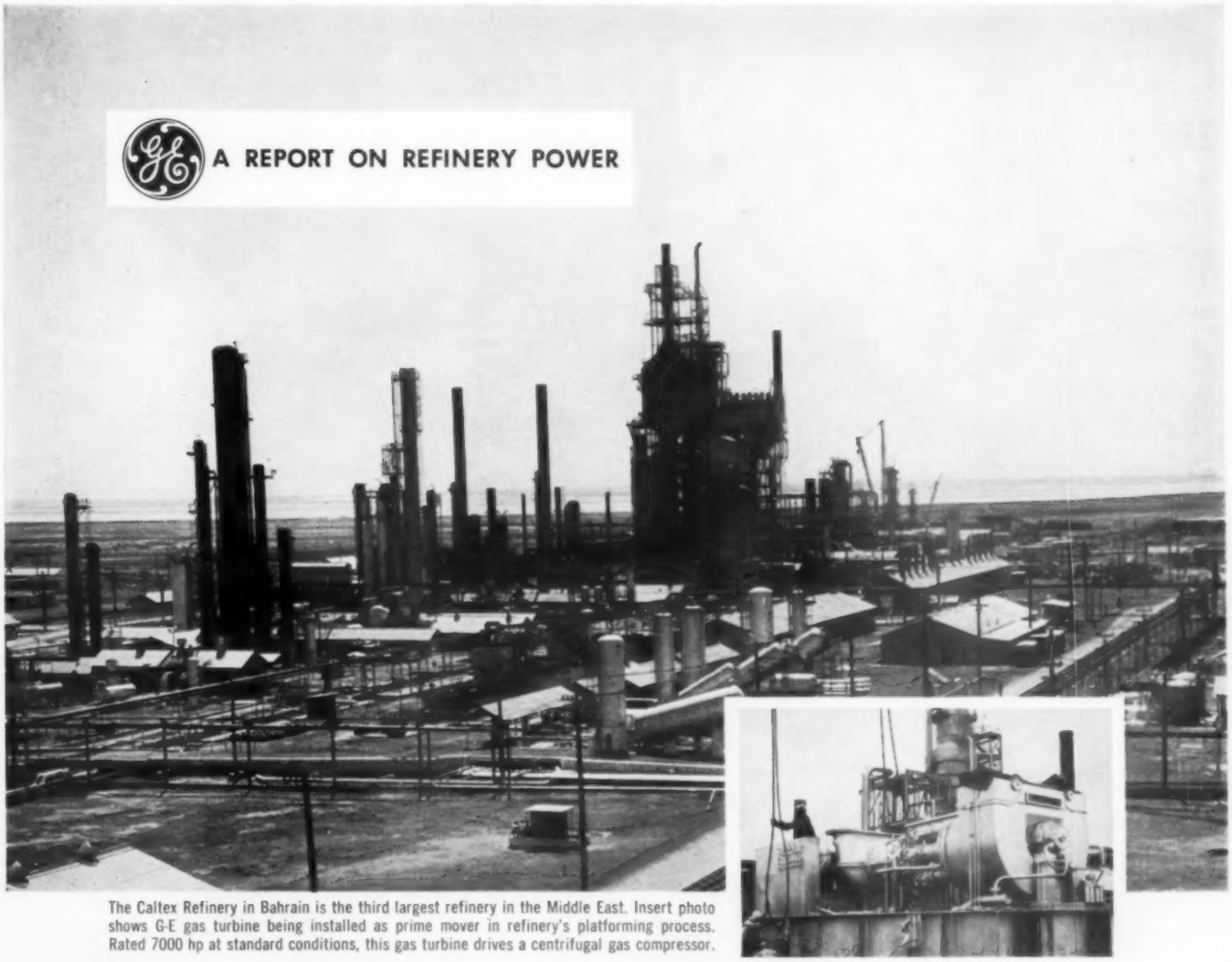
The Texas Co. announced, September 1, that its new 20,000 b/d refinery at Santiago de Cuba had begun operations. The refinery is located about 3 miles south of Santiago de Cuba. The installation, which is estimated to have cost over $15 million, includes a gasoline-treating unit, a catalytic reforming unit, a liquefied petroleum gas unit, and a hydrotreater. Tank capacity is about 1,400 bbl.

The installation also includes a 1,000-ft dock in water over 40 ft deep. A dredging project is expected to open Santiago's harbor for the first time to ships drawing up to 40 ft. Texaco has drilled six water wells with a capacity of 4,000,000 gal daily. An 81,000-bbl-capacity water tank serves as a reservoir for the refinery, and augments the sea-water system which is provided for fire protection. Charles M. Cutbirth is superintendent of the new refinery. He was formerly superintendent of the Vengref refinery in Venezuela.

"Britain and Europe"

(299 pp; 1 full-page map; 40 full-page charts; statistical appendix; numerous statistical tables in text; paper-board cover; 15/-net (16/-packing and postage included); obtainable from booksellers or the publishers: The Economist Intelligence Unit Limited, 22, Ryder Street, London, S.W.I.)

This is the first attempt by an independent organization to analyze the effect on British industry of the European common market with or without a free trade area in which Britain would participate. The large team of EIU editors, research workers, and statisticians conclude that manufacturers as a whole will be considerably better off if there is a free-trade area than if the common market alone develops. Of the industries studied, covering some 85% of total manufacturing industry, those likely to be adversely effected by 1970 within a free-trade area account for less than 15% of the output. Oil refining was listed as a gainer.



The Caltex Refinery in Bahrain is the third largest refinery in the Middle East. Insert photo shows G-E gas turbine being installed as prime mover in refinery's platforming process. Rated 7000 hp at standard conditions, this gas turbine drives a centrifugal gas compressor.

GENERAL ELECTRIC GAS TURBINE CHOSEN BY CALTEX FOR HUGE BAHRAIN REFINERY

Critical Platforming Process Required Prime Mover With High Availability

Once again the General Electric gas turbine has proved its flexibility and its dependability. Now, for the first time, it is being used as a prime mover for the very critical platforming process at the huge Caltex Refinery in Bahrain.

In platforming, the prime mover must be able to operate continuously—24 hours a day—for periods as long as 18 months. Any temporary halt in its operation would mean costly delays for the entire processing equipment. The need for high availability was one of the principle reasons behind the choice of a G-E gas turbine for Bahrain. In addition, these versatile units are easy-to-install and offer other important advantages such as lower operating costs and less maintenance.

Throughout the world G-E gas turbines are being used by the petroleum industry for compressor drive, power generation and exhaust heat. They have established continuous service records amounting to thousands of hours of trouble-free operation. This kind of dependable performance has stimulated the industry into searching for new ways to use G-E gas turbines. To find out how dependable General Electric gas turbines can work for you in your operation, contact your nearest G-E representative or write: *International General Electric Co., Dept. 58-35, 150 East 42nd Street, New York 17, N.Y.*

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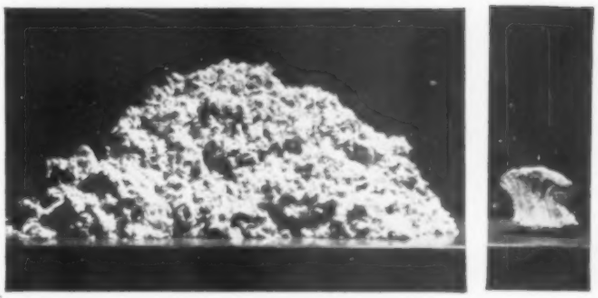
CAPE

Refinery Insulation

All CAPOSITE moulded insulation materials are made of Amosite asbestos. The photograph clearly demonstrates the immense volume which is obtained when the natural Amosite is fiberised—the sign of high efficiency as an insulating medium.



CAPOSITE is supremely well suited to the thermal insulation of oil refineries. With a limiting temperature of 1000 F., high thermal efficiency and great structural strength and resilience, CAPOSITE has gained for itself a unique position among thermal insulation materials used by the Oil Industry.

CAPOSITE MOULDED ASBESTOS FIBRE PIPE INSULATION

EFFICIENCY DATA SHEET—PIPE SIZES 6" to 10" BORE.

HOT FACE TEMPERATURE °F.			400 F			600 F			800 F		
THERMAL CONDUCTIVITY K—B.Th.U. in./sq. ft./hr./in./°F.			0.43			0.47			0.53		
MEAN TEMPERATURE °F.			250			350			450		
Nominal Pipe Size	O.D. Pipe	Thickness of Insulation	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.
6"	6¼"	1"	135	87·7	126	233	90·6	167	354	92·5	218
		1½"	102	90·8	107	177	92·9	135	270	94·3	171
		2"	83·6	92·4	97	145	94·1	118	223	95·3	145
		2½"	71·8	93·5	91	125	95·0	107	192	96·0	128
		3"	63·5	94·2	86	110	95·5	100	170	96·4	117
		3½"	57·3	94·8	83	100	96·0	95	154	96·7	109
		4"	52·6	95·2	81	91·7	96·3	91	142	97·0	103
8"	8⅝"	1"	130	88·0	127	225	90·8	169	341	92·7	222
		1½"	97·7	91·0	108	169	93·1	137	258	94·5	174
		2"	79·2	92·7	98	138	94·4	120	211	95·5	148
		2½"	67·4	93·8	92	117	95·2	109	180	96·1	131
		3"	59·2	94·6	87	103	95·8	102	159	96·6	120
		3½"	53·2	95·1	84	92·7	96·2	96	143	96·9	111
		4"	48·5	95·6	82	84·6	96·5	92	131	97·2	105

These figures are compiled from results of official tests by THE NATIONAL PHYSICAL LABORATORY, TEDDINGTON, computed in accordance with formulae shown in BRITISH STANDARD SPECIFICATION appendices.

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Eugene Holman, Chairman of the Board, Standard Oil Company (New Jersey)

Esso

STANDARD OIL COMPANY (NEW JERSEY)

AND AFFILIATED COMPANIES

DU PONT *Petroleum Chemicals* NEWS

Number 84 in a Series of Bulletins for the Petroleum Industry

FEBRUARY 1958

A STORY OF MEN AND EQUIPMENT

Turning DuPont's automotive research into service for refiners

COLOR...
boon to petroleum merchandising

DuPont, a leader in the research and manufacture of dyes since 1916, has developed brilliant, appealing colors for petroleum products.

Since the 1920's dyes have been used in gasoline to indicate TEL content. In later years refiners have become increasingly color conscious. Today, dyes are used in all types of petroleum products – kerosine, home-heating oils, tractor and diesel fuels, and lubricating oils and greases.

Merchandising value

The trend toward increased use of colors in petroleum products has been due largely to industry appreciation of its merchandising value.

In products other than gasoline, brand identification through the use of color can provide an important competitive selling advantage. This has been ably demonstrated by a number of motor oil and grease marketers.

Now, heating oil and diesel fuel suppliers are becoming increasingly interested in the merchandising value of petroleum dyes. The current interest in "premium" heating and diesel fuels seems to be apparently increasing the demand for merchandisable color.

A secondary but extremely practical reason to use petroleum dyes is leak detection. Color quickly points out wherever a leak occurs, making quick repair possible. Hence color in this use can greatly reduce loss of product and, at the same time, promote safety, protecting personnel against fumes, and property against the hazards of fire.

Let us help you

In addition to oil-soluble dyes for petroleum products, DuPont's over-all experience in the world of color covers a uniquely broad range of product categories – textiles, paints, colored plastics, photographic film, and basic pigments manufacture, to mention a few. And we are prepared to offer you the most comprehensive color assistance available in the additives field.

To take advantage of this assistance, you are invited to discuss your color selection and technical dyeing problems with one of our Petroleum Chemicals Division representatives.

by R. O. Bender

Adapting your fuels to satisfy the growing octane appetite of modern high compression ratio engines involves a rapidly changing technology. As a leading supplier of tetraethyl lead and other additives for petroleum products, the DuPont Petroleum Chemicals Division provides a wide range of services to help you keep pace with these constantly advancing fuel requirements.

PAUL RICHARD is a DuPont Petroleum Chemicals Division automotive liaison man in Detroit. He acts as a sort of "clearing house" for technical information of interest to both the petroleum and automotive industries.

Behind these services are the research experience and know-how of scores of DuPont chemists and engineers; the extensive facilities of the DuPont Petroleum Laboratories; and our continuing liaison work with the automotive industry. All these combined help us produce technical information that helps to bridge the gap between the automotive and refining industries.

Although most of our combustion chamber and other automotive research

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

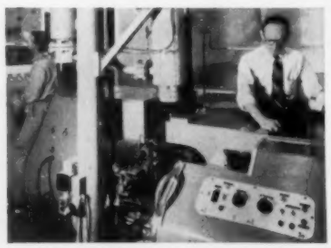
DU PONT *Petroleum Chemicals* NEWS

CONTINUED **Research Services**

activity centers around the Du Pont Petroleum Laboratory in Deepwater, N. J., an important part of our investigations has its roots in the automotive plants in Detroit. Paul Richard and Donald Diggs keep in close touch with new automotive engine developments. They study compression ratio trends as well as other design factors which may affect the quality of fuel the new engines will need. Their information is used at the Petroleum Laboratory to build or modify the future type engines in which fuel performance is studied. Between this close automotive industry liaison and the Laboratory's own investigations, our Petroleum Chemicals Division is able to offer the refining industry research information of timely interest and value.

Unique equipment used

To develop and tailor this information to your needs, the Petroleum Laboratory maintains a fleet of specially equipped and instrumented road test cars. These include advanced design, as well as current model engines. The electronics section of the Laboratory has developed also many unique instruments to study the mechanisms of knock and other abnormal combustion phenomena.



THIS SPECTROMETER is one example of the unusual equipment being used at the Du Pont Petroleum Laboratory for studying the chemistry of knock and the fundamentals of combustion. A single-cylinder engine, which can be seen in the center of the picture, is used in conjunction with the spectrometer.

Varied specialties

The staff at the Du Pont Petroleum Laboratory is unusually complete. It includes chemists, mathematicians, physicists, refinery and automotive technologists, engine and fuel rating specialists. There are also electrical engineers whose chief job is to develop instrumentation for measuring and recording transient phenomena. Together, these men make up a well coordinated research team with extensive training and experience in the field of combustion.

Results available

The research results developed by this team are made readily available to the whole refining industry. They are published periodically in papers presented to scientific organizations and industry technical associations.

Write us for more information about this program or published results of our automotive research work.

You ought to know...

ALFRED R. MULLIS is Assistant Director of Sales of the Petroleum Chemicals Division. Prior to this assignment, he was manager of the Division's Eastern Region with headquarters in New York.

Mr. Mullis joined the Du Pont Company in 1947 as a sales representative in the Gulf Coast Region. He was appointed manager of this region in 1951 and transferred to New York the following year.

Mr. Mullis is a graduate in chemical engineering from Rice Institute. His first job was on the research and development staff of a large refining company. During World War II, Mr. Mullis spent four years in the Navy as a petroleum inspector for the Bureau of Ships.

When he was promoted by Du Pont to Assistant Director of Sales, Mr. Mullis succeeded Mr. W. Sam Carpenter, III who became Director of Sales. Mullis's former position as manager of the Eastern Region was filled by Earl G. Bennett, formerly manager of the Central Region with Chicago headquarters. Mr. Bennett was succeeded by Donald W. Frison, formerly manager of the Mid-Continent Region, with headquarters in Tulsa.

HOW Du Pont DMF Antistall Additive prevents carburetor-icing

When vaporizing in a carburetor, gasoline absorbs heat from its surroundings. This cools the metal parts of the carburetor and the water vapor in the air which is drawn into the carburetor.

This cooling process causes the moisture to condense and freeze when the atmospheric temperature is anywhere in the range from 22 to 55°F. – and when the relative humidity is 65% or more. Ice then forms in the carburetor causing the engine to stall from fuel starvation.

Du Pont DMF protects the motorist against annoying stalls by preventing the formation of ice in carburetors. The DMF does this by lowering the freezing point of the condensed water in the carburetor to well below 32°F. This action is positive and unfailing.

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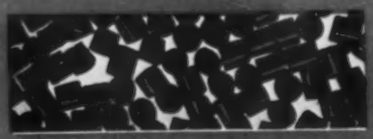

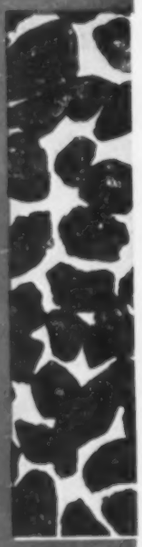

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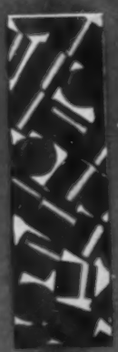

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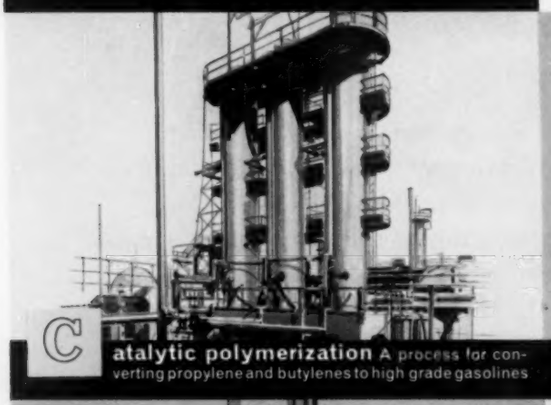

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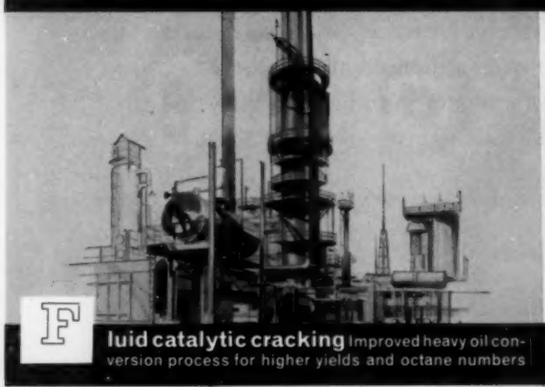

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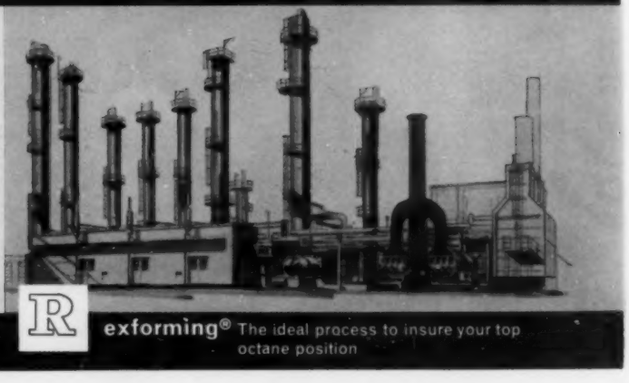

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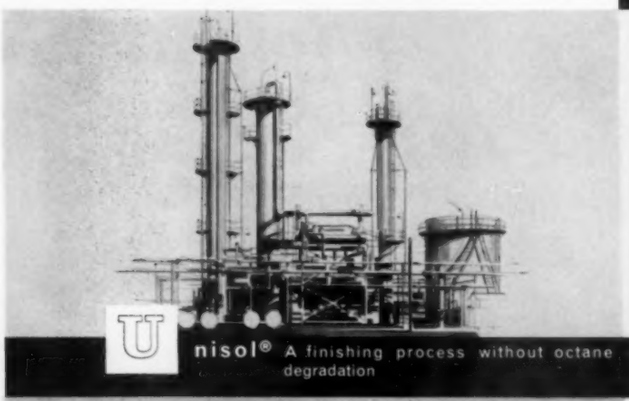

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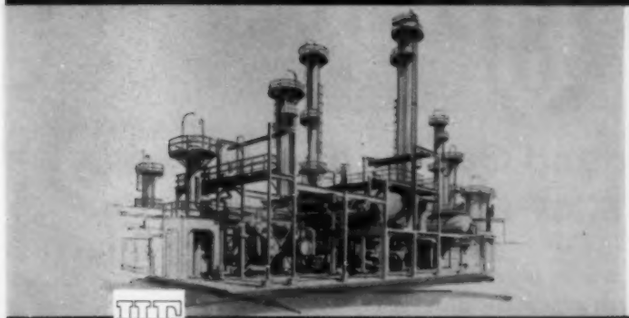

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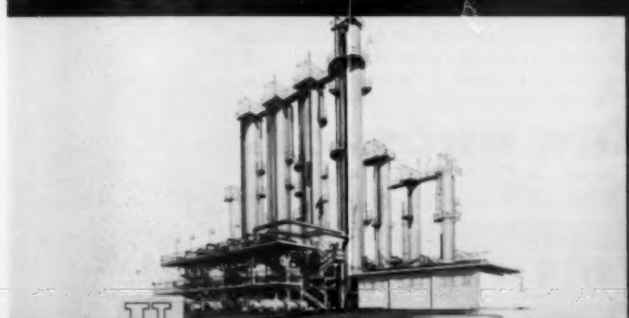

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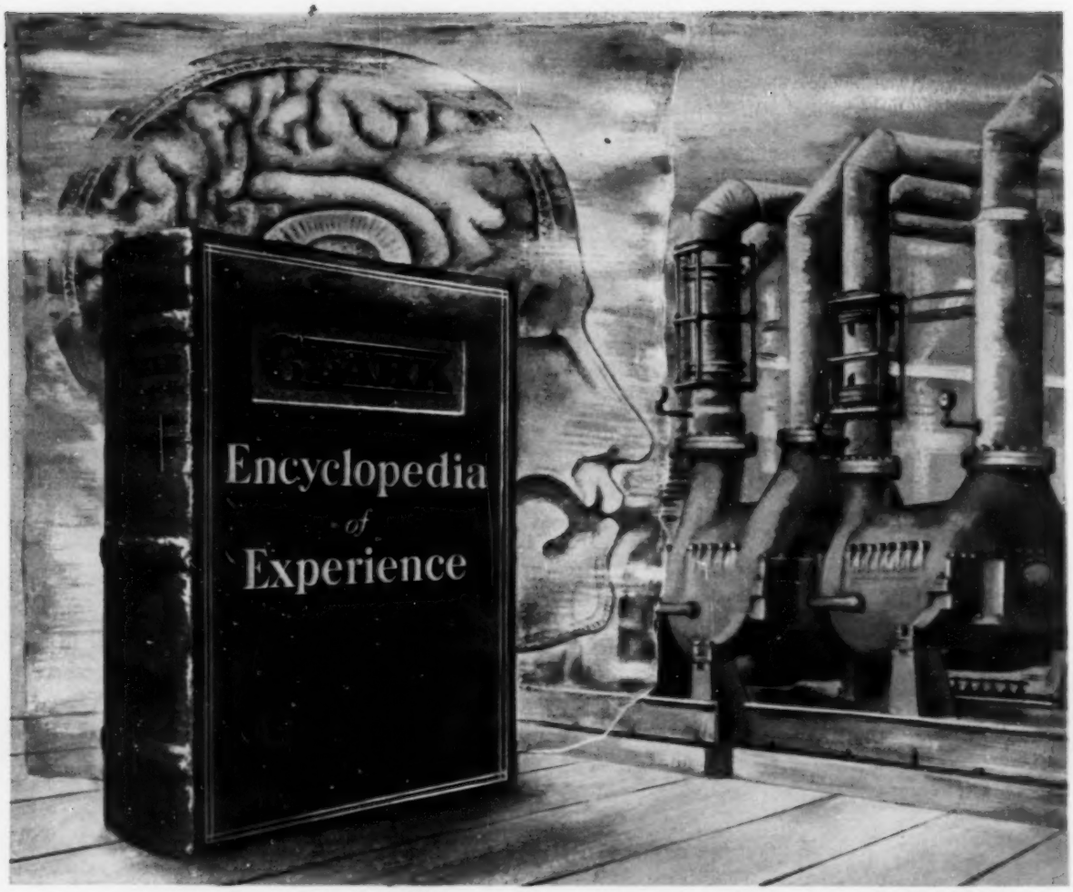

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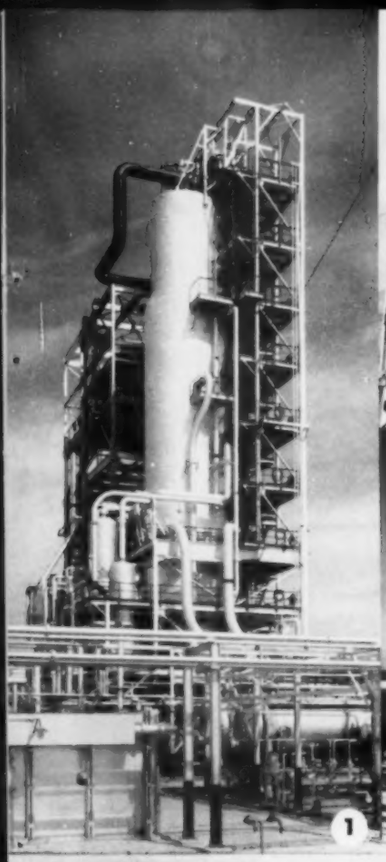

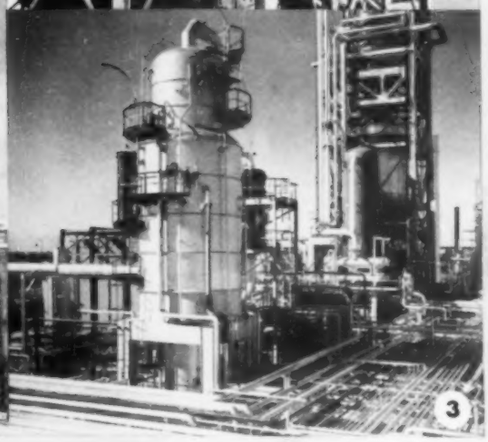

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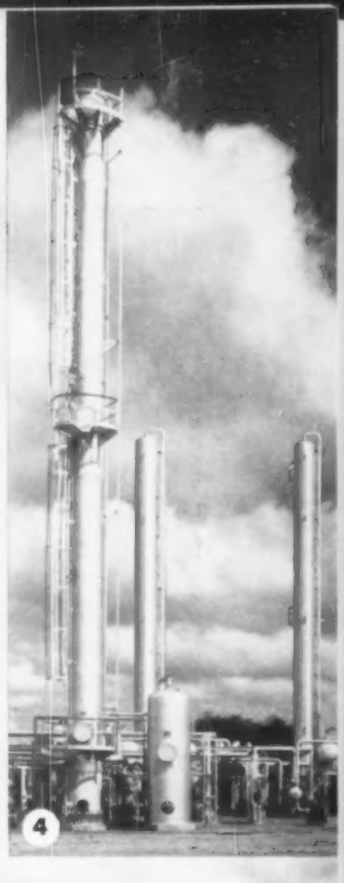

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Oil and Diplomacy

Events of the past two years in the Eastern Hemisphere have highlighted the view of many students of world politics that we are in the midst of a ferment which may not subside within the lifetime of most of us. The surge of nationalism in Asia and Africa, the desire for freedom from foreign domination, or even foreign influences, is complicated by intramural tensions in some areas and by other unresolved problems.

Nationalism in its most severe form has created situations such as the chaos now existing in Indonesia, where extremists not satisfied with independence won from the Dutch of the main developed areas of the country are willing to pull down their economy around their ears to gain undeveloped Western New Guinea (Irian). This is not because New Guinea would add to the Indonesian economy or because it is an ethnic unit with Java, Sumatra, and other parts of the young nation. It is, on the contrary, a symbol which the extremists have chosen for their purposes.

On its face, this seems another illustration of the historical fact that extreme and radical leaders usually arise when moderates are unable to solve outstanding problems. This happened at the time of the American Revolution, and has been exemplified many times since.

As for North Africa and the Middle East, the Arabs are a resurgent race fired with zeal to regain their ancient stature as free people with their own individual culture. To them, this is more important than improvement of their living standards to the levels enjoyed by other peoples of the world.

The entire situation is complicated by the cold war between the communist and capitalist ideologies. The so-called communist ideology of the USSR is not communist at all, but is rather Statism in an advanced form. In the guise of improving the economic status of other peoples and freeing them from the domination of colonial powers, the missionaries of the Kremlin are pursuing expansionist policies no different from those of the 19th century czars, who dreamed of possessing the decaying Turkish empire and a then weak Persia. Unchanged in fundamental purpose, the new masters of Russia won an agreement from the Nazis in World War II recognizing Persia as a Russian sphere of influence. Failure of that alliance has not changed Russian aims.

Today it seems clear to many that the basic ambitions of the Arab would have created a situation which is made to order for the Soviets. In a recently published book titled *Will the Middle East Go West?* Freda Utley draws a deadly parallel between the march of events in the Middle East today and events which led up to the creation of China as Moscow's most subservient and powerful satellite. Miss Utley observes in her book that, at the outset, the Soviet emissary and the Chinese signed a joint statement specifically rejecting communism or socialism for China. Subsequently Russian arms, money, and political advisors poured in and China finally became fully integrated into the Soviet orbit.

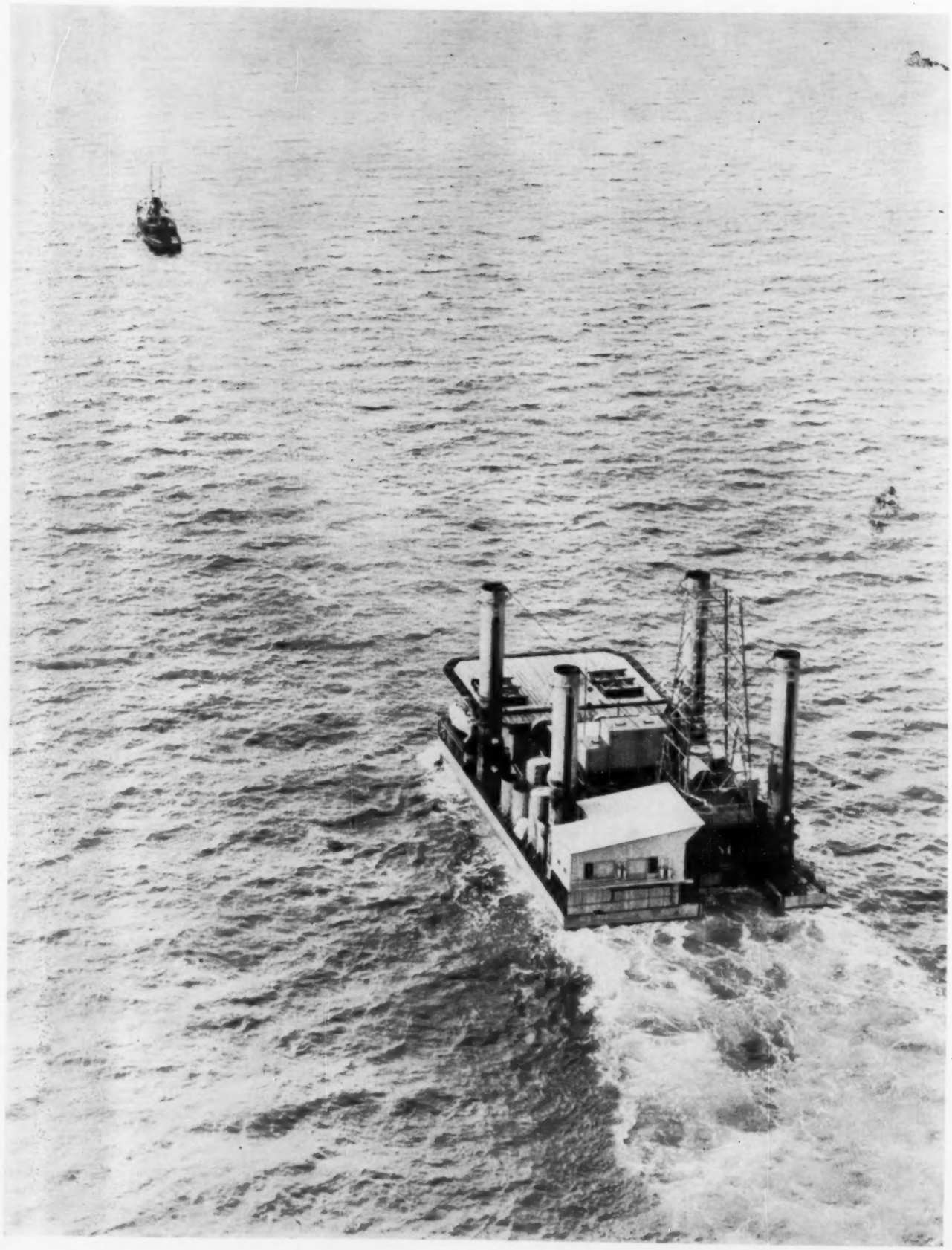
Today the Communist Party is outlawed in Egypt. Syria disclaims any leaning toward Soviet principles. But in each case arms and technicians are being received. The Soviet aid is being welcomed because of the intense reaction to western policies.

The propaganda mills are operating on an overtime basis. We have just witnessed an Asian conference in Egypt to which Soviet representatives were received with garlands of flowers and the usual trappings of the politically inspired welcome.

The international petroleum industry has long since learned how to operate successfully in foreign countries. First rule in the book is to ascertain and respect the ideals and aspirations of the nationals of whom the foreign oil men are guests and to refrain from interference in domestic politics. Of equal importance is the necessity for patient and continuing negotiation of economic or other differences and the recognition that agreements must be renegotiated from time to time in the light of changing conditions. Helping citizens of underdeveloped countries to help themselves is a tenet of this industry.

It is axiomatic that western Europe particularly, and the rest of the world to a lesser extent, need the raw materials obtainable in the Middle East and other undeveloped petroliferous areas. Disappearance of these resources into the Soviet orbit after the manner of China would be a disaster of the first magnitude.

Leaders of the oil industry could help prevent such a disaster if called on by government to employ their skills learned in many years of day-to-day harmonious living with peoples of other lands. Oil men could help by teaching the diplomats that the national aspirations of other countries must be respected and the dignity upheld of their leaders as well as of their lowly citizens. The industry could contribute by showing our diplomats the everyday techniques oil men employ in patient and continuous negotiation. Such aid to government was given in a conspicuous manner during the Iranian crisis, and could be employed again if government ceases to look on the industry and its operations with suspicion and recognizes that international oil men are everyday diplomats with real skills learned the hard way. END



New concessions spark offshore oil search in Persian Gulf

Aramco to step up drilling with new barge; Abu Dhabi Marine Areas readies drilling off Trucial Coast; Japanese and Italian interests win concessions in northwest part of Gulf.

Left: "Adma Enterprise," the DeLong mobile drilling barge built for the first under-water deep test well to be undertaken in the Persian Gulf by The British Petroleum Co. and Compagnie Française des Pétroles, being towed to the Persian Gulf from Germany, where it was built. This tow, a distance of 6,800 miles, was one of the longest on record. This photograph shows the barge on its way through the English Channel (BP photo).

THE continental shelf of the Persian Gulf is to be actively explored during 1958. Two offshore rigs now are on the ground, and a third will soon be on its way. Work on earlier offshore concessions by Arabian American Oil Co. and by Abu Dhabi Marine Areas Ltd. will be supplemented by exploration activities of Azienda Generale Italini Petroli through the operating company SIRIP, and by Japanese interests operating as Japan Petroleum Export Co. Both the Italian and Japanese companies recently were granted concessions, so that actual drilling is not to be expected for a good many months during which geophysical work will be done and logistical problems solved. Aramco is producing one offshore field, and has announced the discovery of a second. Abu Dhabi Marine Areas already has a drilling barge on its concession, and is ready for active drilling.

Western and southern marine areas in the Persian Gulf now are largely committed, as is indicated in an accompanying map. Only the area offshore from Kuwait is uncovered by concessions. The Ruler of Kuwait called for bids in his offshore area a year ago, but thus far no action.

A concession over the Saudi Arab portion of the Neutral Zone's offshore area was given on December 9th to the Japan Petroleum Export Corp. The area cannot be developed, however, until a contract with the ruler of Kuwait has been signed. To date, the Kuwait contract has not been concluded. Reportedly, the Sheikh is more interested in a large initial bonus than in increased participation (as contained in the contract with Saudi Arabia).

In the northern and eastern half of the gulf over which Iran claims oil rights, only the SIRIP concession has been granted, but the Iranian government has invited oil companies to bid on additional areas. The Iranian Oil Exploration and Producing Co. (consortium) has oil rights offshore out to the three-mile limit along perhaps a thousand miles of the Iranian coast. The consortium also controls a group of offshore islands and to the three-mile limit around these. SIRIP has offshore rights out several miles from its onshore concession on the Gulf of Oman.

Bids for concessions over much of the uncommitted offshore area in the Persian Gulf will be accepted by Iran up to March 31. These bids are to be examined within 60 days after that date, and announcement of awards made in due course. The new area lies largely south and east of the SIRIP concession, which covers 2,100 square miles of continental shelf.

In addition, Iran has announced it will accept bids for both onshore and offshore concessions east of the huge consortium concession bordering on the Gulf of Oman and the recently granted SIRIP area.

Boundaries of offshore jurisdictions in the Persian Gulf are ill-defined at this time. In general, it is the policy of bordering countries to claim to the center of the Gulf. In most instances, the central part of the submerged area is too deep to be of immediate importance—with depths running to about 250 ft or more. In the future, the industry may perfect commercial techniques for drilling in water this deep.

At the head of the gulf, where there is a large area which is not deeply submerged, it will be important to settle boundaries between the continental shelf under the jurisdiction of Kuwait, Iraq, and Iran. The government of Iraq is particularly concerned, since it has a relatively short shore line. Recently the government issued a communique asserting jurisdiction over "resources in the contiguous zone of Iraq's territorial waters." It has been suggested that the governments concerned have a conference to settle boundaries before any dispute arises.

The Persian Gulf is of peculiar interest to the oil industry as a possible future oil reserve because of its proximity to the world's greatest oil fields and because of the breadth of the continental shelf covered by water of relatively shallow depth. The gulf is roughly 600 miles long and an average of about 150 miles wide.

Most of the southern and western half of the gulf may be considered shallow enough for drilling with today's techniques as developed largely in the Gulf of Mexico. Offshore from the Trucial Coast, around the Qatar peninsula and Bahrain Island, is a vast area covered with less than 30 ft of water. There is similar shallow area off the coast of Saudi Arabia. At the head of the gulf, the 30-ft line extends as much as 30 miles from the shore line at some points. Iran is not so fortunate as her neighboring countries across the gulf. Offshore depths increase rapidly in many places. Shallowest regions are at the head of the gulf and near the Straits of Harmuz.

Active drilling has been done only by Aramco and Shell thus far. Shell was unsuccessful in finding oil offshore from Qatar, and its drilling operations came to an untimely halt late in 1956 when its drilling barge was largely destroyed by a sudden storm which struck without warning while the rig was being moved from one loca-

tion to another. A new Shell rig now is being built for drilling at a location off the coast of Doha.

Aramco has carried on an active reconnaissance program in the gulf for a number of years—with two discoveries to its credit. Most recent discovery is Manifa No. 1, located eight miles offshore, 30 miles southeast of the Safaniya field, and 120 miles northwest of Dhahran.

Drilling of Manifa was begun September 30 last with the "Queen Mary" drilling barge which has been employed in development drilling at Safaniya for the past six years. The test was dry at 6,220 ft in the Cretaceous which produces at Safaniya, but a drill-stem test in the Arab "A" zone between 8,747 ft and 8,794 ft brought gas to the surface in 3 min and oil in 20 min. Shows were encountered in the Sulaiy lime above the Arab zone. At the close of 1957, Aramco was engaged in further coring and testing operations at Manifa. Except for Safaniya, all production in Saudi Arabia is from the various Arab zones of Jurassic.

Although Safaniya was discovered in April 1951, it was not until April 1957 that commercial production was begun. Initial output was at the rate of 50,000 b/d, but by the end of last summer this had been stepped up to 115,000 b/d—and equipment is on order which will permit the movement of 175,000 b/d from the field by mid-1958.

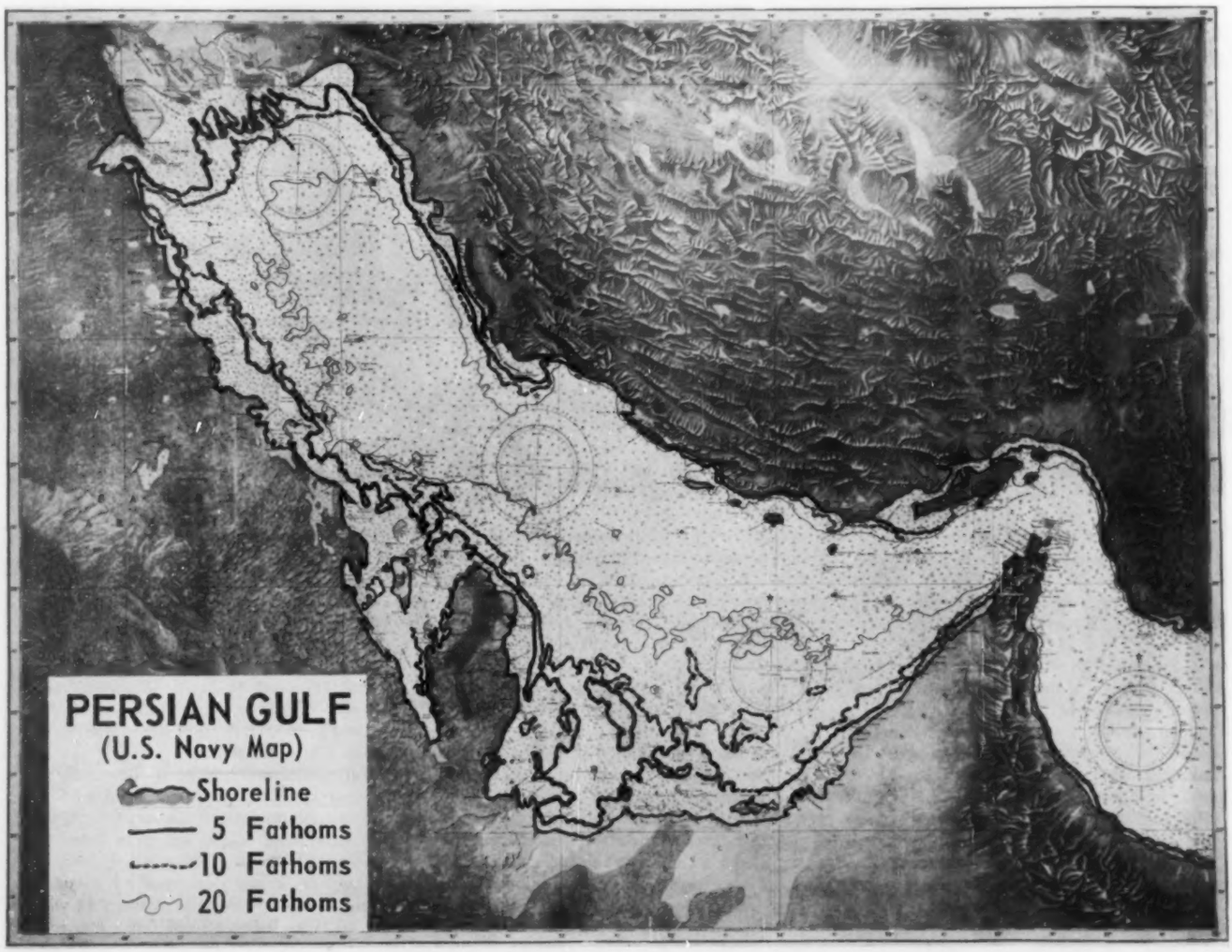
Decision to begin producing the field at this time was based on the characteristics of the crude which make it particularly desirable to refiners. The crude is a 27-gravity mixed-base oil which yields a high percentage of fuel oil. Gas oil produced has a high octane number, and the kerosine has an excellent burning quality. It gives a good yield of lube distillate and of asphalt. The oil thus produces yields more in line with the pattern of market demand than lighter oils from other fields. Unlike other Arabian crudes, the oil is sweet—containing no H_2S.

Aramco spent $21 million to bring Safaniya crude to market. The new facilities included a 142-mile 22-in. pipeline and a 16-in. submarine gathering line extending 12 miles into the gulf. This main line is provided with 6-in. flow lines to individual wells. Oil from the field may be pumped directly to the Aramco refinery at Ras Tanura or to the tanker-loading terminal.

Additional capacity to be achieved by mid-year will result from the installation of four Ruston & Hornsby combustion gas turbines and pumps at the Khursaniyah field pump station, and one additional turbine-driven pump at Safaniya also is being extended.

Drilling has been more active in the Safaniya field during the past year than in any other area in Saudi Arabia. Nine wells were completed during 1947—bringing the total at the end of the year to 28. Two of these are onshore, and 26 in the Persian Gulf. On December 31 last, 16 wells were producing, 11 standing, and one used for observation. It is planned to complete four more wells during the first half of 1958.

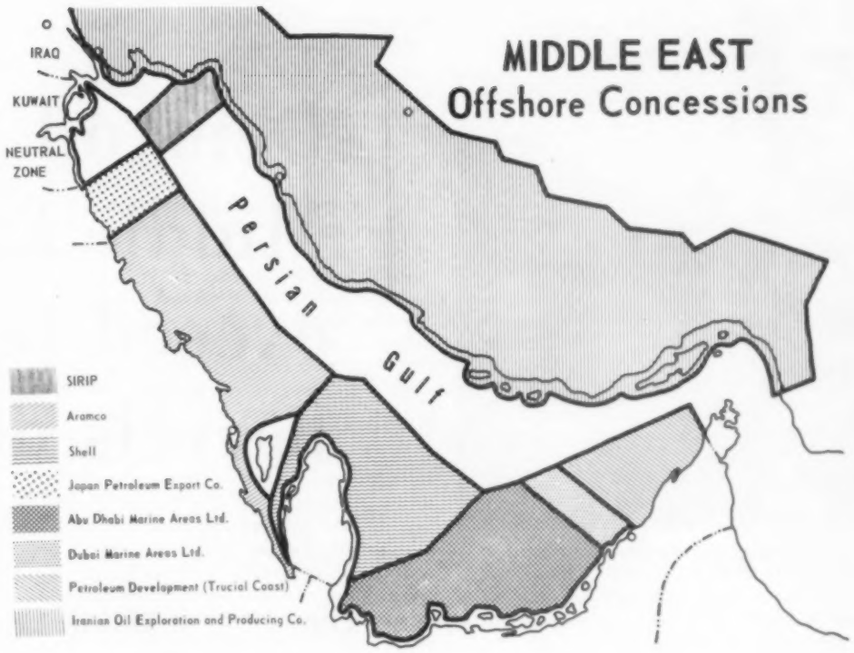
The Safaniya field is an elongated structure some 20 miles in length. Proven area is

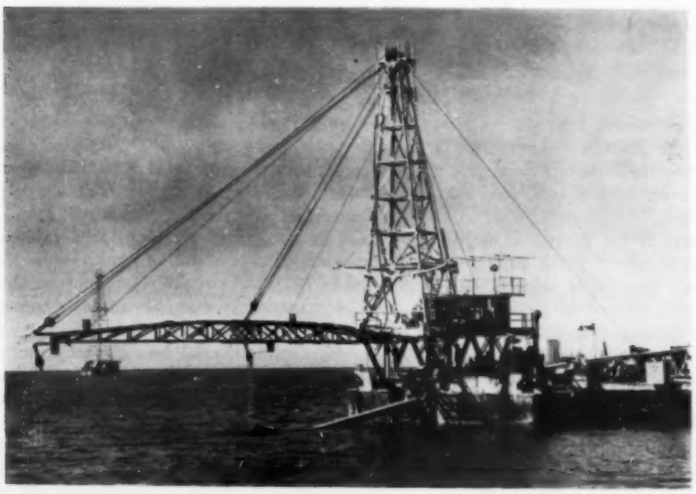


some 64,000 acres in the Bahrain sand, topped at about 5,000 ft. The Zubair sand, also of Cretaceous age, has proved productive in three crestal wells. Indicated productive area in the lower sand is about 3,000 acres. Structurally, the field is a relatively simple fold with gentle flank dips.

For more rapid development of Safaniya and evaluation of the newer find at Manifa, the company has purchased an additional offshore rig. The new unit is to be a mobile drilling platform built by R. G. LeTourneau Inc., of Longview, Texas. It will follow LeTourneau's design—using three triangular open-truss legs elevated by electric-motor-driven pinions on racks mounted on the legs. The 103-ft legs will permit drilling in 75 ft of water with 10 ft of clearance below the bottom of the hull. The platform will carry a 136-ft standard derrick. Drawworks and rotary table will be driven by individual electric motors.

The new LeTourneau rig will be the world's first "miniature" mobile platform designed specifically for use with a platform tender. Chief difference in operation of the new junior platform and the self-contained units is that virtually all supplies





Completed sections of the 16-in.-diameter pipeline are lowered into the waters of the Persian Gulf by the Arabian American Oil Co.'s pipe-laying barge in the offshore Safaniya field.

Below: Aerial view of the offshore wildcat well drilled by the Arabian American Oil Co. at Manifa, in the Persian Gulf: Moored to the drilling platform, is the 174-ft drilling barge "Queen Mary." (Aramco photo)

and crew accommodations will be contained on a tender. Like the larger units in the Gulf of Mexico, the Persian Gulf unit will be triangular in shape. Electric power for operating the legs will be supplied by diesel generators located aboard the platform. Power for the drilling equipment, however, will be supplied by generator sets aboard the tender. LeTourneau is building only the platform, and not the tender. Approximate dimensions and capacities for the Aramco unit are as follows: Length overall, 92 ft; width overall, 88 ft; depth of hull, 10 ft; length of spuds, 103 ft; diameter of spud tanks, 18 ft and 4 in.; height of spud tanks, 10 ft; total load during elevation, 112½ tons; and maximum load in fixed position, 350 tons.

The "Queen Mary," which has been drilling at Safaniya for the past six years, was

(Continued on page 64)

Surface mapping in the sand dune areas of Saudi Arabia. (Aramco photo)

Demand for Middle East crude to exceed four million barrels daily in 1958

Only 12% of Middle East crude moves to the Western Hemisphere. European and Asian demand will permit an increase of about 15% over depressed 1957 levels.

1958 is expected to be a year of normal development in the Middle East. With the Suez crisis now history, the outlet for Middle East crude in Europe has been regained from the West, and this year should be geared to that economy as well as with the consumption east of Suez. Only in the United States will demand for Middle East crude be affected seriously. The "voluntary" restriction on imports in the USA probably will continue throughout the year under the pressures exerted by independent domestic producers who have been chafing under deep proration. Canada also is suffering from an oversupply of domestic crudes, but is unable to displace foreign oil with its own production because of the cost of bringing western crude into the Montreal market now served from offshore. Venezuela will, of course, be an active competitor of the Middle East throughout the Western Hemisphere and, to a lesser extent, in Europe. Adverse factors mentioned should not prevent Middle East production from averaging well over 4,000,000 b/d in 1958.

Despite the heavy movement of American oil to Europe in the early months of 1957, the Middle East was able to produce an average of 3,557,000 b/d of crude last year. This was an increase of 4.5% over 1956. By the end of the year, output was averaging 3,930,000 b/d, or 10.5% over the 1956 record.

As indicated by Marvin Case in his forecast published in the January issue of WORLD PETROLEUM, it is expected that demand for petroleum products in western Europe will rise about 11% in 1958. A 7% expansion of the market east of Suez is anticipated. After all, these are the two great markets on which the Middle East really depends. In 1956 the movement of Middle East oil to the Western Hemisphere averaged less than 400,000 b/d, less than 12% of production.

In Europe, part of the growth in oil demand has been created by the conversion of industry from the use of steam coal to oil. This trend was slowed by Suez. It may not resume its former rate for some time because of the fear of interruption of supplies. Over the long term, the trend toward fuel oil is inevitable. Most European power plants when converting from coal to oil do not make the installation in such a manner that fuels can be switched instantly. Reconversion from oil to coal in Europe involves expanse and delays. It is necessary, therefore, that confidence in the stability of supply be achieved before previously programmed conversions are undertaken.

American coal now is competitive in some parts of Europe with fuel oil from Middle East crude. Steam coal at the USA mine selling at $5.50 per ton delivers at European ports at about $17.80 per ton after payment of all freight charges and the import company's handling charge. European coal has a value of about $10 to $11 per ton at the mine, but is not susceptible to large increases in output. Seams are deep and thin. Mechanization on the USA scale is not feasible. Result is that the European miner produces 1.7 ton per day while the USA miner produces 10 tons. There is an import duty on coal as well as on oil, but government subsidies to the domestic industry keep prices roughly on a par.

The economics department of a major oil company in France has calculated that French energy requirements in 1954 totaled the equivalent of 105.4 million metric tons of coal. By 1961, this demand will rise to 138.0 million, and by 1965 to 158.0 million. France produced 54 million tons of domestic coal in 1954, but probably will not be able to produce more than 62 million tons in 1965. Development of unused water power should add another 6.1 tons of coal equivalent, and nuclear energy 2.0 million tons. The remainder of the anticipated increase in energy demand of 35.4 million tons of coal equivalent must come from oil and gas. Fortunately, France's Lacq gas field can be developed to produce a coal equivalent of 8 million tons by 1965, but oil's share of the market will more than double. In other European countries where gas has not been found in large quantities, the increase in oil demand is expected to be even greater. Percentage participation in the French energy market in various years is shown in the following tabulation:

ESTIMATED PARTICIPATION IN FRENCH ENERGY MARKET

Year	*1954*	*1961*	*1965*
Coal	63.5%	54.4%	48.1%
Oil	22.4	30.3	32.5
Hydroelectricity	13.8	12.3	13.1
Natural gas	0.3	2.9	5.0
Nuclear energy	—	0.1	1.3
	100.0	100.0	100.0

For the immediate future at least, development in the Middle East depends on

preparation for long-term demand rather than for the present. Fields now being produced are capable of supplying available markets without exceeding MER. The industry recognizes, however, that oil must be found well in advance of requirements, so it will proceed diligently to carry out geological and geophysical reconnaissance work and follow this up with the drill. Elsewhere in this issue is an account of current and prospective work to be done on the continental shelf in the Persian Gulf. Onshore, there will be little change in the rate of drilling which has been carried on in recent years. Stepout work will be done to prove the extent of recent discoveries, and prospects recommended by the exploration departments will be investigated.

Iran is to be particularly active. The consortium recently announced it has appropriated $140 millions for capital expenditures in 1958 and 1959. About a third of this will be spent to enlarge facilities for the Gach Saran field, which has a potential far larger than can now be produced. Iran's largest field, Agha Jari, also will be expanded greatly as a result of an important extension well recently drilled. The consortium will step up its exploratory work and operate nine rigs this year. A pipeline will be laid to the new jetties now being built for tanker loading at Bandar Mashur. Housing and other amenities for a growing personnel are to be built.

The government oil company is to be given $17 million for development at Qum, where National Iranian Oil Co. expects to produce about 40,000 b/d for domestic use while potentialities of the field are investigated.

Saudi Arabia has two new discoveries, made during 1957, which will require evaluation by stepout drilling. One of the discoveries is offshore, 30 miles southeast of Safaniya, and the other in the western part of the Aramco concession 90 miles northeast of Riyadh and 150 miles southwest of Dhahran. The fabulous Ghawar area still requires additional drilling for evaluation, both to north and south of the 140 continuous miles of known producing structure.

In Kuwait, a new field at Raudhatain, in the northern part of the country, has been confirmed by two producing wells, and Kuwait Oil Co. now has begun a development program to evaluate the property. Wildcatting continues on a moderate scale.

Iraq is coming back from its disaster when the pipeline outlet to the Mediterranean was closed by pump-station sabotage. With two stations out of commission, throughput is only half the pre-Suez rate of 534,000 b/d. Outlet from southern fields will be increased as rapidly as possible by development of port facilities at Fao and the installation of more line capacity. In northern fields, Iraq Petroleum Co. will add five new rigs to those now drilling, and pipeline outlet will be enlarged.

In Dhofar, Cities Service is running two rigs to evaluate its Marmul discovery and test other known structures.

Egyptian oil production fell to a low point in 1957, but now is increasing rapidly. Plan is to bring output to 40,000 b/d in 1958.

Exploratory drilling will be active in Turkey again in 1958 and, as discussed elsewhere in this issue, offshore work in the Persian Gulf will be conducted in several areas.

Transportation should not present difficult problems in 1958. Movement by pipeline to the Mediterranean will increase as a result of the expansion of Tapline's capacity and the further work on the IPC line from Iraq. Suez transit is restricted to some extent by a reduction in the canal depth, but the Egyptian government's canal authority expects to increase the draft depth to 35 ft this spring. Further widening and deepening is planned at a cost of $200 million.

The proposed pipeline through Turkey appears to be dead. Oil companies, which showed interest in the idea months ago, now are not doing anything about the matter. Of the original companies, only two are left which show interest in going ahead.

The line probably cannot get much help from the USA government for financing the venture; and the project is so costly, it makes even the largest business go slow.

The US State Department reportedly wants to see an alternate oil-supply route, both for the Western world and the economy of the Middle East. However, as usually, State is reticent.

Here are five questions asked of an official spokesman by WORLD PETROLEUM:

1. Have there been any negotiations towards one or more treaties to pave the way for a line of this kind and, if so, what is the present status of this line of endeavor?

2. Has there been any official reaction from countries involved in the Middle East to the US government on the proposal?

3. Have there been any communications to the government of Turkey about the project, and have they brought any response? What is the sense of the communications and response?

4. Does the tension in the Middle East between various countries, the problems of the Arab League, of Syria and of Iraq, indicate that the project should not be pushed at this time?

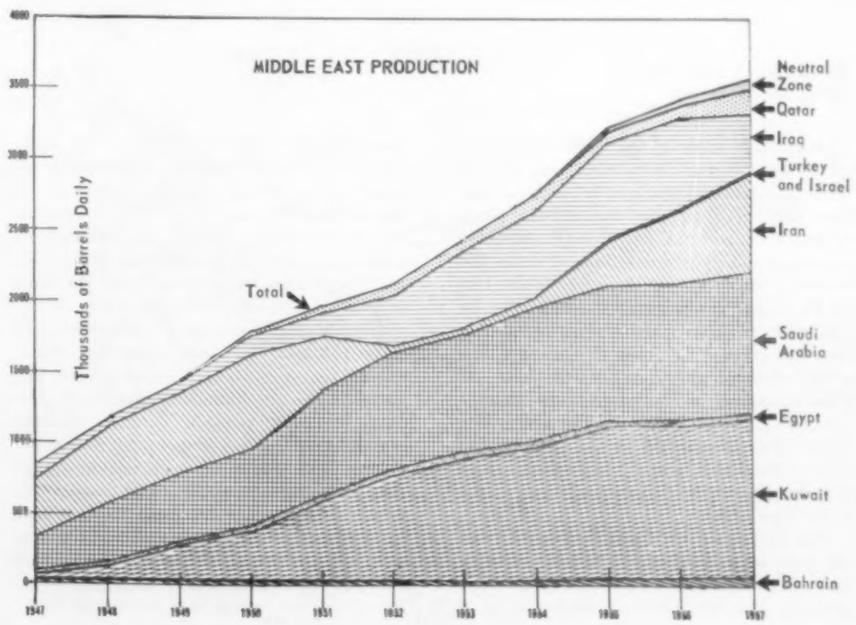
5. Are US government guaranty funds adequate to take care of a project of this magnitude?

A spokesman for the State Department gave these answers:

"There have been no negotiations at all. With some of the companies, we have talked informally. There have been no hard proposals, and everything is just preliminary. I can't say that we have gotten any reaction.

"It probably would be a good thing to have another pipeline. But there are other problems for the oil companies. A new line would bring more oil to the Mediterranean, and there would have to be more tankers ready to take the oil away than there are now."

A source close to the State Department added that the main roadblock at present turns upon money. This source explained that the International Cooperation Administration has some funds to guarantee USA foreign investment against expropriation. But no one sees the ICA fund as adequate to cover a project of this magnitude, which might cost as much as $800 million. And without some assurance against loss, USA oil companies are reluctant to put large amounts of money into the line. END



Westcoast natural-gas line: Caterpillar No. 583 pipelayers at work at Chilliwack, B.C., Canada: Job was 110 miles long—laid with 30-in. pipe (photo, courtesy Mannix Ltd.).

Canada's Westcoast gas to USA

The spectacular Westcoast natural-gas line has been inaugurated, and will shortly start feeding gas into the Pacific Northwest. It is a tribute to the vision of the McMahon brothers, originators of the line, who overcame all natural obstacles and won a fight for FPC approval by hooking up with Pacific Northwest.

by Leslie O. Rowland,
Editor, *Oil in Canada*

TRAVERSING some of the most spectacular scenery in the Canadian Rocky Mountains, Canada's first major natural-gas export line was completed two months ahead of schedule, and has had its official opening to inaugurate an initial flow of some 300 million cubic feet per day. The 30-in. line of Westcoast Transmission Co. Ltd. runs for 649 miles from its main compressor station and gas-processing plant at Taylor, a few miles south of the huge Fort St. John gas field, to Sumas, on the international boundary 50 miles southeast of Vancouver. The entire line is situated in the province of British Columbia, and the fields from which it is drawing its gas supply are largely in the same province.

The final tie-in weld was made on August 10, 1957, after a monumental job involving two seasons of construction and four spreads. For the sponsors and owners of Westcoast, it was the culmination of a project which started long before the Leduc oil discovery in Alberta—exploratory work in the northeastern region of British Columbia by the McMahon brothers, native sons of the province, which finally paid off in 1951 with the discovery of the largest gas field in western Canada at Fort St. John.

The pipeline had been visualized several years before, as a result of several minor discoveries of gas which preceded the big strike at Fort St. John. With the major discovery, it was possible to start definite organization for the project, but the frustrations and delays of surmounting applications to various government bodies involved four years of intensive battling had resulted before the construction of the line was finally approved in the fall of 1955. An affiliation agreement with Pacific Northwest Pipe Line Co., which had previously been granted approval for main-line service to the Pacific Northwest states, provided the outlet for the large volume of export gas necessary to support the Westcoast line.

Construction started in the early winter of 1955, in the southern sector where the winter climate is not severe, and a good deal of clearing and grading of right-of-way was accomplished that winter. A short time later rock gangs went to work with snow on the ground in the more accessible mountain regions and winter stringing started wherever snow was not too deep. Pipe orders had been placed far enough ahead that shipments from the United Kingdom were on the ocean within days after the final government permit had been issued.

All these advance preparations were indispensable in speeding up the whole construction program, and they expedited the

work so greatly that, by the end of the 1956 construction season, there were 457 miles of pipeline completed—leaving only 192 miles to lay in 1957. One contractor, by pushing deep into the winter, succeeded in laying all the pipe on its section and was able to complete the job early in 1957 with only a small tie-in and backfill gang to finish off a few miles. Canadian Bechtel Ltd. was engineer and designer, and provided all the inspection staff for the entire job.

The route of the line goes through a great deal of country which is similar to that encountered on the Trans Mountain construction project in 1952 and 1953; but in two places in the southern mountains it broke new ground through territory where no pipeline had been thought feasible at the time the Trans Mountain crude-oil line had been laid. Westcoast contractors applied to advantage the construction experience of the contractors which built the Trans Mountain line, especially in work through muskeg and mountain rock.

The line was designed for initial throughput capacity of 400 mmcf per day, with the original objective to reach this volume by the heating season of 1959-60. The first four compressor stations, which have now been completed, will put through the initial load. So quickly has the indicated demand grown however, that the second stage of increasing capacity to 660 mmcf per day by the addition of the next five compressor stations has been advanced a full year, and it is intended that they will be in operation by the fall of 1958. This decision had been made even before the construction of the main compressor station and the processing plant was very far advanced, and the design of these units lends itself to expansion.

The main line, starting on the north bank of the Peace River at the Taylor plant, crosses the river on the longest aerial suspension bridge ever built for a pipeline in Canada. The first 50 miles are through muskeg, with a few rocky ridges over ground which is mostly heavily timbered but contains a few scattered farms on small patches of drained muskeg soil. Then it joins the valley of the Pine River, which it follows to and up the east slope of Pine Pass. This stretch of 65 miles gets increasingly steep and rocky as it rises to the top of the continental divide at the summit of the pass, in pure mountain topography. The descent on the west side is also through solid mountain rock, but on both sides there are bogs and sinkholes of muskeg even on the high parts of the route and many run off channels which wander at random across the right-of-way and sometimes flow with considerable force after rain or heavy melting of snow.

Five miles below the summit the route passes Azouzetta Lake, where the first section ends. This section, contracted to Dutton-Williams Brothers Ltd., was the only job to be completed in 1956, and covers 120 miles.

Section No. 2 follows the valley of the Misinchinka River for its first 25 miles; then crosses the Parsnip River under water at its junction with the Misinchinka, and parallels the Crooked River valley for the next 60 miles through rugged mountainous and hilly terrain which gradually levels out as it nears Prince George, the first town on the route, at MP235. The Fraser River is crossed on a third aerial suspension bridge at Shelley, a few miles north of the town. The route hangs onto the upper wall of the broad Fraser valley over steeply undulating terrain, with heavy timber and stickly clay soil, for the next 94 miles to the end of the 209-mile section at a point just south of Alexandria. Canadian Bechtel Ltd. was the contractor on this section.

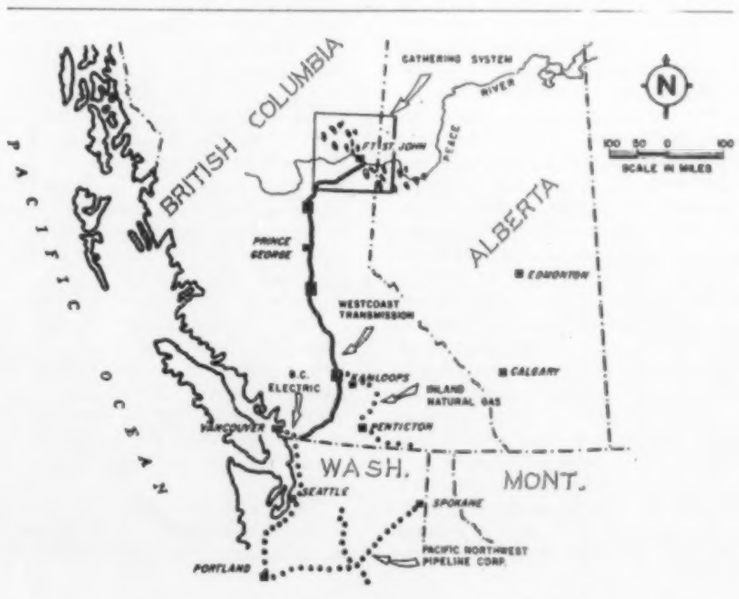
The same topography and terrain persist well into section No. 3, which comprises 209 miles. It leaves the Fraser valley after 20 miles, and cuts across the plateau into the interior BC desert at Williams Lake. The entire section from this point on is mainly desert, with patches of light to medium dry-land trees and successions of compacted sand banks and canyon-banked rivers. The line-up to 100-Mile House, historic stage stop on the Caribou Trail of gold rush days, is never far from the main John Hart and Caribou highways—the former good gravel surface, and the latter mostly blacktop. South of 100-Mile House it traverses country so lonely that access roads can be secured only by using old logging trails which switchback up the steep slopes of the side hills. In the middle of this desert strip, the line crosses the main lines of both railways and the Trans-Canada highway at Savona, where the second largest compressor station was built to provide the take off power to supply the system of Inland Natural Gas Co. Ltd., a subsidiary company serving the interior cities and towns.

The last 10 miles of section No. 3 run through heavily timbered land beyond the desert, and the section terminates on the verge of the rough-canyon and high-mountain terrain at Glenwalker. Conyes construction Co. was the contractor.

Section No. 4 travels through the canyon of the Coldwater River for its first 27 miles, then turns across the mouth of the Coquihalla canyon which contains the Trans Mountain right-of-way and runs through the parallel Boston Bar Creek canyon for 20 miles, rejoining the Coquihalla canyon halfway along its course and staying in it for 18 miles to its junction with the lower Fraser River at Hope. The Fraser River is crossed here, and the line goes over the top of Agassiz and Angel Mountains for about eight miles. The last 42 miles are through the thickly populated and heavily congested market garden and dairy farm country of the Fraser valley—with blacktop roads and fences occurring several to the mile. This section was let to universal Pipe lines Ltd.

The Pacific and Great Eeastern Railway provided good rail transportation for pipe and other supplies and equipment from the Pacific seaboard to the central 200 miles of the line, but truck transportation was needed for most of the other portions. In the northerly sector, supply routes were by rail through Dawson Creek for a short distance west, and the rest of the way by truck. Stringing truck travel was extensive throughout the job in both years. Pipe was stock piled at several points, and two double-jointing yards welded a considerable amount of pipe in the summer of 1956.

The winter stringing was a major factor in permitting Dutton-Williams Bros. Ltd. to work fast enough that its final tie-in weld was completed in December 1956 after a nip-and-tuck race with the winter weather. Its large rock gang, with more than a dozen twin drills and jackhammer units, kept comfortably ahead of the pipe gang all season—although it had the toughest and longest rock footage of all four spreads.



WESTCOAST TRANSMISSION SYSTEM

Right-of-way for Westcoast Transmission here is in the heart of Coquihalla canyon. Grade here is 30 deg (photo, courtesy Mannix Ltd.).

The spread on section No.1 worked from north to south, but all the others moved from the south to the north ends of their sections. On section No. 2, Canadian Bechtel Ltd. conquered an extremely wet mid-summer period with better than one mile per day average pipe laying, and the spread did not shut down until the end of November when snow and cold weather compelled it to stop. Double-jointing of pipe was done on the entire section, and it was a large factor in reducing the size of the firing line welding gang. The spread, under superintendent Mike Finnerty and project manager Henry Mogg, laid 145 miles in the 1956 season, and had only 65 miles to go when it moved onto the snow-covered right-of-way again on May 10. Bulldozers were used to clear snow ahead of the big rock gang which had approximately 18 miles of rock ditch to make through the mountain region at the north end of the section. Right-of-way in the rock territory was shot and cleared ahead of the ditch gang, which used four twin-drill units on sideboom tractors. Each unit, powered by a 600-hp compressor, could get an average of 350 ft to 400 ft of finished ditch per day. The rock ditch managed to keep ahead of the pipe gang right up to the end, so that there was never any delay in waiting for ditch.

Rain was a severe problem in 1956; and in 1957, when the spread was working up to Pine Pass summit, the rain was almost a daily occurrence for at least a short period. Mud was one of the principal hazards, but access roads were also very difficult—especially in the last 30 miles where the steep grades of the canyon walls above the highway made it necessary to winch stringing trucks up switchback trails. The equipment in some places had to travel three or four miles along the right-of-way between access roads, and grades of 30% or more for distances of 1,000 ft were frequent.

The front-end gangs on the Bechtel spread had some of the heaviest equipment seen anywhere in western Canada in both seasons. The right-of-way gang used nine bulldozers of the Cat D8 class for clearing and grading after the brushing subcontractor had got the heavy timber off the grade.

The rock on this section was granite, and shotholes were drilled on 30-in. centers to insure maximum breakup with 40% forcite. Backhoes were used to clean out the ditch after the shooting. Tungsten-carbide bits on the drills lasted for an average of 1,000 ft to 1,500 ft each, drilling to a depth of 8 ft to insure a minimum of 6 ft of finished ditch.

A feature of the stringing which was rather unusual in such rough terrain was that Canadian Parkhill Pipe Stringing Ltd. avoided transfer to Athey wagons, except for a few short stretches, by adding extra tow-tractors to the stringing trucks. On the steep grades, it was common to have two tractors winching the trucks over the summit.

The winching method was used frequently for the welding machines, and special blocking and maneuvering were required to set them in so that they would not shift or roll down the hills. A tremendous amount of skidding was also required behind the pipe gang and welders because of extreme variations for the big sags and overbends in the hilly country coming up the west slope of the pass.

The pipe-gang vehicles were Athey wagons, with three Lincoln 300-amp welding machines on the stringer-bead unit and

four Lincoln 300 machines on the hot pass, feeding two pairs of hot-pass welders. Only two welders were employed on stringer beads. The value of double-jointing was emphasized by the achievement of 9,000 ft of welded pipe in the best day and an overall average of one mile. The dope gang was able to keep up to this pace also, with heavy equipment which included three Cat 583 pipelayers purchased brand-new in the 1956 season.

The pipe-gang units were kept flexible and fast-moving for the rough terrain by splitting the hot-pass machines into two separate units—although both were towed by a single tractor. On tie-in sections, this made it easy to swing one unit around regardless of right-of-way condition. Light tow tractors were used, with a Cat D7 on the stringer-bead unit and a Cat D6 on the hot-pass units. An MD7 was used for line-ups.

Flooding of the right-of-way for short distances was a common occurrence in the mountain region, because of the summer runoff swelling of all the little streams which crossed the line at more or less right angles. Some of the runoff channels were cut pretty deep by the tractors, and machinery occasionally bogged down in them.

About half the ditch in the 1957 construction season was cut by two Buckeye 51 rotary ditchers, and the other half by nine new Bucyrus-Erie 22B backhoes which were purchased in Canada at the start of the season. Because of the limited working space on the right-of-way, especially through the mountain region, ditch was kept ahead of the pipe stringing all the way.

The redeeming feature of the remoteness of the area in the 1957 season was the absence of tie-ins, which averaged a mile between. Slack loops were almost nonexistent because of the frequency of bends in the mountainous topography, including a large number of side bends to get around tough rock outcrops and cliffs. Heavy equipment on the tie-in gang included three Cat 583 pipelayers. Only one bored road crossing and one rail crossing were made in the 65 miles. The final tie-in weld was made on August 10, at the north end of the section.

There was virtually no accomodation of any of the northern portion, and the men on the spread this year were housed in a portable trailer camp at the Parsnip River. The Dutton-Williams spread had used similar accomodations in 1956 because of the remoteness of its section from any hotels or urban centers.

Climatic conditions were by far the best on section No. 3, but the lack of access roads and the heavily rolling topography to some extent offset the relative lack of downtime. The Conyes spread finished the 1956 season almost at the end of the desert area after crossing the Kamloops plateau with its maximum elevation of 4,250 ft. Spread superintendent Harlan Evans pushed the work along for 122 miles last year, leaving only 87 miles to go this year. In spite of running into wet weather on the more temperate-weathered part of the section, north of historic Hundred-Mile House, the spread averaged one mile per day through the fabulous Caribou ranching country which contains some of the world's largest cattle ranches.

Large boulders deposited by glacial action provided a hazard for the ditchers, and timber was fairly heavy; but there were few streams to cross. The rotary ditching was done by two Buckeye 51 rotary ditchers, and no solid rock was encountered. Winching both up and down the steep slopes had to be resorted to for the ditchers. Hand shoveling was the usual practice to clear glacial boulders away from the ditcher wheels; but the smaller stones could be picked up in the buckets, and more than half the 1957 ditch was cut with the rotaries, the rest by backhoes. The greatest concentration of boulders was found on the top of the hills, where the larger ones were dropped first by the glacial streams.

Pipe-gang equipment included two of the new Lincoln-Caterpillar double twin-arc welding units, in which the control panel for the welding machines is operated by the tractor operator to run the fender-mounted welding machines. This spread was the only one in all of western Canada to have two of the streamlined units. Without resorting to double-jointing, the pipe gang laid 250 joints on its best day for a total of just under two miles.

The alternate hills and valleys or. nearly all the 1957 portion of the job almost dispensed with slack loops for the dope gang, and tie-ins were widely spaced because of the absence of fences and roads. The section only crossed the main highway four times, and there were no rail crossings.

As with the other spreads, ditch was cut as far as possible ahead of the stringing, except for the last eight miles where loose sandy soil involved severe caving. The line was welded out on July 20 and doped out on July 21; while final tie-in welding was done before the end of July and valve setting and manifold work were completed at the No. 5 compressor station early in August.

Stringing was less difficult in the 1957 season, as the previous year had found the trucks using the old logging trails which were so narrow that incoming and outgoing trucks were routed to use different trails as far as possible. Where there was only a single trail, the trucks had to be scheduled so that they would not meet.

The Universal spread on section No. 4, with Vic Williams as spread superintendent, had only the worst of the mountain rock territory to complete in 1957, as the first year's work put 70 miles in the ground. The job actually got started in the early winter of 1955-56, as the lower Fraser valley rarely experiences freezing temperature; but the Sumas region contains a water table practically on the surface, and little progress was made in the initial six weeks. The 1956 season ended with the descent of Angel Mountain, on the east side of the Fraser River near Hope, where the abrupt climb up the Coquihalla River valley to the canyon begins.

Rock ditch work started in the canyon in the late summer of 1956, and resumed before the snow had melted in the later winter; a large gang of jackhammer operators and twin drills, working on extremely steep slopes and around sharp sidebends, kept far enough ahead of the pipe that the final tie-in weld was made on July 12. The foresight to get a large advance on rock ditch the previous season was essential to completing the section within the scheduled date, because the working season in this very rough and rugged mountain terrain is short at both ends. Snow lies on the ground to the beginning of June, and often closes in by the early part of September in the fall.

Stringing was done with conventional trucks, but a great deal of winching had to be done to get them up and down the grades. Access roads into the Boston Bar Creek canyon were impossible, so this part of the job was reorganized; travel was entirely on the right-of-way, and all pipe for the 20-mile stretch was yard-coated. This avoided the use of a great deal of excess dope-gang equipment on the pipelaying, and also cut out the high risk of accidents with dope pots on the steep grades. Between the marsh and the swamp land in the lower Fraser valley and the rock and canyons with their grades up to 52% on the upper part of the section, an extra-large tie-in gang was needed. Two Cat 583 pipelayers and two Allis-Chalmers HD21 sideboom tractors were used on this gang.

In order to guarantee meeting the completion date ahead of schedule, a small subsidiary spread was put to work halfway through the 1957 season—starting at the north end and meeting the main spread a few miles along the way, at the mouth of the Coldwater River canyon.

One particular problem throughout the rock ditching was the presence of big loose boulders—some half the size of a tractor—which were too heavy to put off the right-of-way but too loose to be drilled and shot easily. Most of them had to be broken up with jackhammers and the pieces bulldozed away before the solid rock underneath could be drilled and shot.

Under-water river crossings had to be made whenever it was impossible to get by curves in the stream in both canyons. The 20 miles through the Coquihalla canyon required 18 individual submerged crossings.

River crossings represented a large task requiring specialized construction methods; and all the major ones—eight in number—were contracted out to experienced river-crossing firms. The longest of the five aerial crossings was the 1,675-ft span of the Peace River at Taylor. Besides carrying the main line south, the same bridge carries the 26-in. main gathering-system line from the Alberta fields, which runs north across the river to the compressor station and processing plant.

The Peace River crossing was let to a

Principal process units of the Westcoast gas-processing plant at Taylor, B.C.

Pipe gang on Westcoast's gas-line gathering system: Shown here is a hot-pass quad unit.

Pipelines-Bridge-Foundation Co. Ltd., which completed the job on July 15, 1957, after more than a year on the site. The high steep bank on the north side, with an overhang took a great deal of earthmoving, but concrete foundations were expedited by the large natural gravel beds on the river banks which provided all the aggregate needed. The second longest crossing, a span of 1,470 ft across the Fraser River just south of Hope, was also built by Pipeline-Bridge-Foundation. This firm was a joint-venture operation of Marwell Construction Co. Ltd. and Marine Pipeline and Dredging Ltd., both of Vancouver.

These long crossings were both set up with high vertical tubular steel-frame towers with transverse bracing, anchored by heavy steel cables to large concrete block foundations. The tower height is over 200 ft, and the pipeline is supported on a bed of tubular steel loops hung from dual main cables by rigid steel stringers. The pipe section in each case was made up on one side of the river and pushed across through the loops. Extensive guying was resorted to in order to overcome wind stresses. The high-water clearance is 73 ft for the Fraser bridge and approximately 100 ft for the Peace River bridge. The Fraser bridge was completed at the end of July, comfortably within the scheduled date.

The three shorter crossings were all contracted to Barker Construction Co. Ltd., of Vancouver. These jobs also were all started early in 1956, and the last one was finished at the end of August. They were 1,300 ft across the Fraser River at Shelley, seven miles up the line from Prince George; 1,200 ft across the Quesnel River, two miles upstream from its junction with the Fraser at the town of Quesnel; and 600 ft across the Thompson River at Savona, beside the No. 7 compressor station.

The Shelley bridge was designed on the same principles as the two longest spans; but, for the other two crossings, an economical *A*-frame structure was built for the towers. This shape, with less than 100 ft of height, was selected as providing the maximum wind resistance at lowest cost. The main support for the pipe is a single steel cable of 2-3/6-in. diameter, which is fastened directly to the river side of the tower on each side. The backstay cable is also fastened in the same way. In each case a Skagit two-drum hoist was used to raise the towers, with a National hoist as an auxiliary. Each tower leg is embedded in a concrete base 8 ft square.

The sixth aerial crossing utilized the new concrete-and-steel highway bridge across the Fraser River at Agassiz, a few miles below Hope, in the lower Fraser valley. Approaching through marshy ground on both sides, with river weights set at 13-ft centers, this crossing is carried on angle-iron brackets welded to the underside of the bridge. It was finished at the middle of August. Two principle submerged crossings were of the Pine River, which was a multiple crossing over several convolutions, and of the Parsnip River—both in the northern mountain region.

Gathering System: Extensive work was done this season on the large gathering system which is to unite the Alberta and British Columbia fields for feeding into the main line. The entire contract was let to Canadian River Construction Ltd., and a single spread under superintendent E. L. "Tex" Magard laid both the main 26-in. and 20-in. lines and the smaller laterals to the fields which will be on first-year supply. The laterals were put in as the work progressed, with the spread suspending mainline work to run in on the lateral in each case.

Phenomenal speed of construction on the laterals was accomplished by this method of using a much overrated spread for the size of pipe involved. All the laterals were constructed with 12-in. pipe, and a typical example of pipelaying time was the welding and doping of the entire 21,200 ft for the Fort St. John southeast area lateral in one day. The 1957 program involved laying 150 miles of pipe, including 45 miles of 26-in. from the Alberta fields to the compressor station, 41 miles of 26-in. north from this point to a junction where 18 miles of 20-in. was laid to connect up the West Buick Creek field. The rest of the footage comprised 12-in. laterals to tie in the Pouce Coupe, Gardondale, and Pouce Coupe South fields on the Alberta side and the southeast Fort St. John and Red Creek fields in British Columbia. A short section of 18-in. line was also laid as a lateral from the main Fort St. John field.

The final tie-in weld from the Alberta side was made on July 25.

The terrain on the first portion of the gathering system is mostly rolling farm land, with heavy to medium bush and occasional bogs and swamps. From Taylor the line climbs up the steep north wall of the Peace River valley on a nearly vertical grade and goes through increasingly hilly land which is about half cultivated and the other half heavy swamp running to some muskeg. In this part, extensive riprapping was required—including one stretch of seven miles of continuous riprap.

Right-of-way work and grading started in the winter, to take advantage of the easier traveling on the right-of-way before the spring thaw; and quite a lot of riprap was on the ground while it was frozen, providing a firm road surface for equipment to move on. The bulk of the ditching was done by two Cleveland 320 rotary ditchers, which averaged two miles per day, running one single and one double shift. Backhoes were run in for the bogs, swamps, and muskegs.

Stringing trucks had superb conditions for operation, as the rugged gravel-surfaced Alaska Highway, with no load lmits, was never more than a mile from the right-of-way, and trucks regularly carried 10 joints per load.

Bending averaged about one bend to every three joints, but in some of the hilly areas there were two or three bends to the joint for several joints in a row. Overbends and sags on creek crossings, through

swamps and going under roads, were as high as 40-deg curvature.

A feature of the pipe gang was a Lincoln-Caterpillar twin-arc quad unit, consisting of two regular twin units mounted on top of each other on an Athey wagon. Welding speed ran to two miles per day at best, but averaged about 8,000 ft per day because of the large amount of rough country and steep grades which slowed down the equipment. On the 12-in. lines, the pipe gang moved over 15,000 ft average, and the dope gang ran a peak day of 18,000 ft. Pipe was lowered in from the dope-gang catchoff tractor, in spite of the use of asphalt enamel which is normally slow-setting—with a large saving in time by avoiding extra skidding. Tie-ins averaged only about one per mile, as most roads run parallel to the line and not across it, so relatively little equipment was needed—consisting of three Cat D8 sideboom tractors, a utility welding unit on a tubular steel sled, and one dope pot.

Large-scale facilities were built this season at Taylor, consisting of the main compressor station, the gas-processing plant, and a small secondary refining unit—at a combined cost of about $30 million. The processing was made necessary by the fact that the BC fields produce entirely wet gas. A large scrubbing plant is designed to remove all the liquid byproducts, which are then to be processed in the refining unit to produce aviation gasoline and other products. A sulfur-recovery plant is under construction by Jefferson Lake Sulphur Co. as an auxiliary enterprise, with a scheduled initial capacity of 300 tons per day.

The processing plant is set up to handle only the BC gas, with an outlet line which joins the line from the Alberta fields ahead of the compressor station. The Alberta gas is already to pipeline specification when it arrives at this point. The two streams are merged, and come out through the compressor discharge line at 865 psig operating pressure.

The construction contract for the whole Taylor project was awarded to Stearns-Roger-Marwell, a joint venture of Stearns-Roger Engineering Co. Ltd., of Denver, and Marwell Construction Co. Ltd., of Vancouver. Work on the site started in the fall of 1956, and the plant was turned over completed in September 1957. The compressor station was completed in August. R. W. (Bob) Warner of Marwell was general superintendent, and E. V. (Moon) Mullins of S-R was project manager.

The entire site is a natural gravel bed; this simplified foundation work, as no muskeg excavation was required. All the aggregate for concrete was on the site, and a separate area was segregated for mixing concrete. Building foundations went down to a maximum depth of only 6 ft and water lines were buried 8 ft deep for frost protection. The climatic conditions in this region are almost arctic, with a temperature range down to 60 deg below zero.

Ground was leveled and cleared in the fall of 1956, and all main foundation work was completed and main buildings closed in so that work could proceed during the winter—especially on piping and electrical work, with heaters to minimize the cold.

The gas-processing plant is designed for 400 mmcf per day initial and 660 mmcf per day ultimate capacity. It will deliver 65% of the entire line feed, and is designed for continuous operation across the maintenance schedules. Five separate trains of equipment are provided for the gas scrubbing; but, as only four will be operated, there will be one spare at all times, in rotation. The four solid-bed dessicant contactors in the dehydration plant will operate on a staggered eight-hour cycle with automatic switching, so that this part of the process will also go on without interruption. A higher proportion of spare capacity is provided in this unit, because any two contactors can maintain the standard dew point of the gas at designed load factor.

The liquid-byproducts refining unit consists of a Unifier, a Platformer, catalytic reformer, and associated facilities.

The compressor station started operations with six 2,000-hp compressors, with a concrete foundation block poured for a seventh unit when needed. Made by Canadian Ingersoll-Rand Ltd., the compressors are gas-driven KVS models run by reciprocating engines, with automatic discharge and suction-line valves, of 10-in. and 12-in. diameter respectively, operated from inside the compressor house.

Three input scrubbers handle the dry Alberta gas, and feed it into the main line through two outlet scrubbers. Four coolers reduce the outgoing gas to 100 deg from 160 deg. All control operations are routed through a single Canadian Westinghouse Co. Ltd. control panel. A bypass-valve arrangement makes it possible to put Alberta gas directly into the main line without going through the compressors.

The fourth major unit on the Taylor site is the large water-pumping station on the lower bank of the river on the north side. Initial cooling-water requirements are 25,000 gpm, or 36 million gallons per day. Eliminating a cooling tower, the entire processing plant will operate on a once-through flow system. The pumphouse building, 90 ft x 30 ft, is set on a thick concrete slab foundation resting on the solid gravel of the river bed. It is constructed in two halves, so that either side can be shut down for repairs without interrupting the flow. Stop logs in the suction pit permit selection of intake water from any level, and the extra weight of the foundation removes any risk of the house's floating when the pit is empty.

Five vertical closed impeller pumps were installed, of 6,000 gpm capacity each, four being driven by 700-hp electric motors and the fifth by the returning cooling water. This water comes down with a 190-ft head because of the steep slope of the river bank, and runs a 700-hp turbine.

All equipment in the process plant, compressor station, and pumphouse is housed because of the extreme cold in winter; and all process equipment in the refinery, except fired heaters and the Platforming and unifier reactors, are similarly protected.

Climatic conditions also influenced building design, which provides for a snow load of 40 psi and a wind velocity of 100 mph. Heating specifications call for minimum inside temperature of 40 F when the outside temperature is 40 F below zero and the wind is 25 mph. This is achieved by a rigid frame construction of the Braden-Butler style. Sheathing is corrugated aluminum on the outside and asbestos sheet on the inside, enclosing a 2-in. fiber-glass sandwich for insulation. This contruction type provides high rigidity and strength without great bulk.

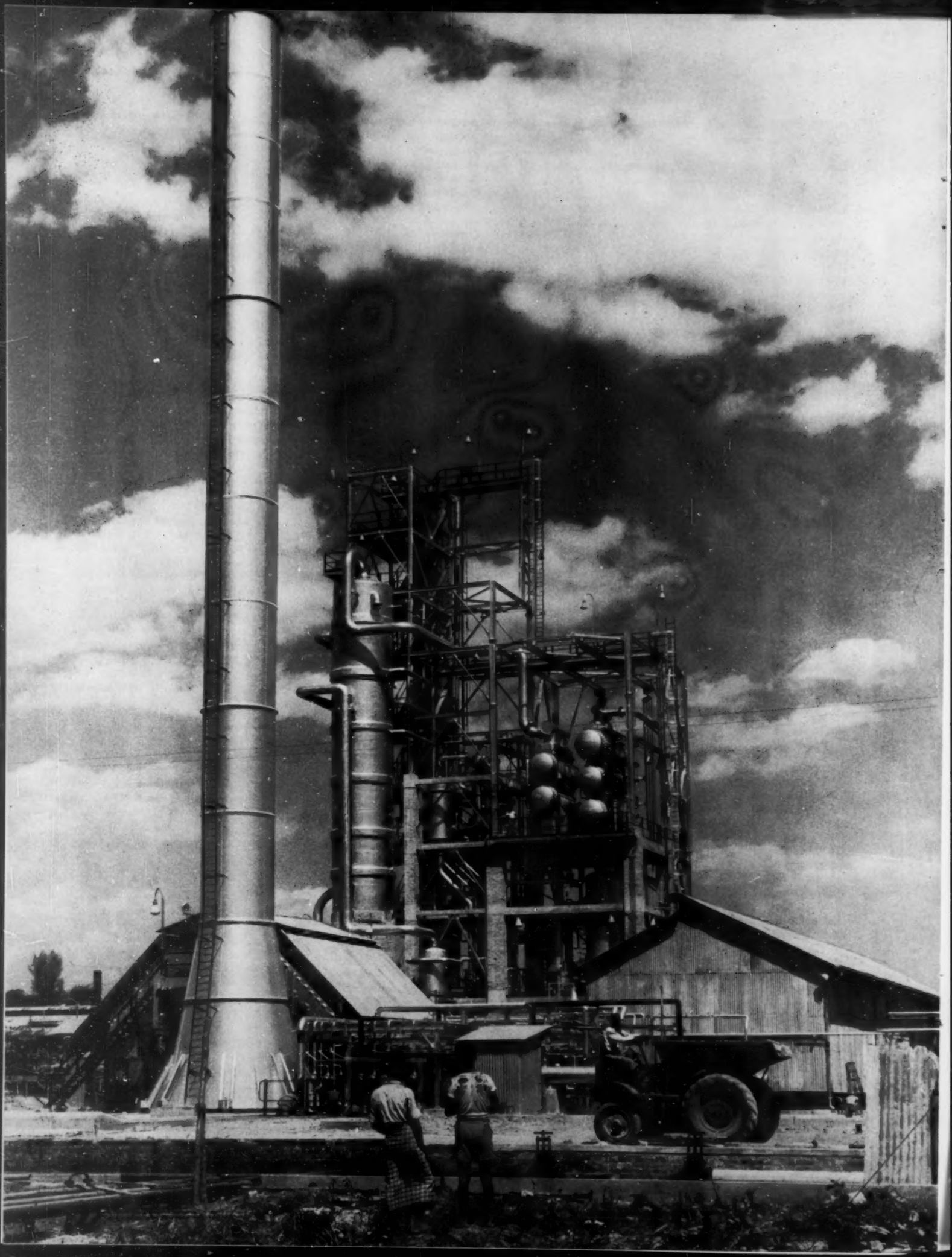
Three down-the-line compressor stations were included in the original design, and have been placed in service. Their construction was contracted to Dutton-Williams-Stearns-Roger, a joint venture of Dutton-Williams Bros. Ltd., of Calgary, and Stearns-Rogers Engineering Co. Ltd., of Denver. Work proceeded on much the same schedule as at the Taylor site, with winter construction going ahead inside the enclosed buildings. Each station contains DeLaval 24-in. x 24-in. single-stage centrifugal compressors driven by 3,500-hp Nordberg gas engines of the 4-cycle V-type Supair-thermal brand, which operate on line flow.

The No. 3 station at McLeod, at the west end of Pine Pass, and the No. 7 station at Savona, where the line is tapped by Inland Natural Gas Co. Ltd. for its big distribution system, started with four compressors each; while the No. 5 station at Australian, operating as a booster station, started with only three.

Because of the lack of rail transport in the northern sector, the John Hart highway was used north of Shelley to move the engines for the McLeod station. In a unique over-the-road haul, the huge units were placed on sleds and towed over the ice-covered highway by large Caterpillar tractors at an average speed of 12 mph for a distance of 75 miles to the station site. An extra tractor was winched on the back end to provide hold-back power for the downgrades, which were even more difficult to negotiate than uphill. This tractor also added pulling power for the uphill grades.

The largest camp ever set up on a construction job of this type in western Canada was constructed for the contractors at Taylor by Canus Services Ltd., of Vancouver, and this firm provided all the catering service both at this site and in three branch camps for the gathering-line crews and compressor-station gangs. As many as 900 men were housed and boarded in the camp at the peak of the construction season. Very superior accommodations and food were provided, and this contributed materially to a relatively low turnover of employment on all the jobs.

The engineering, design, and inspection of the whole system of main-line and gathering system were done by Canadian Bechtel Ltd., under construction manager R. L. Bowman. The compressor-station and metering-facilities design was done by Ford, Bacon & Davis, Canada Ltd. END



Burma Oil Company rebuilds war-destroyed Syriam plant

BURMA OIL CO. (1954) LTD. has completed the reconstruction of the Syriam refinery which was destroyed during World War II. With a capacity of 3,500 b/d, the Syriam plant supplements the refinery previously built at Chauk and again makes Burma virtually self-sufficient in her major oil requirements.

Syriam has been the principal refining center in Burma since the turn of the century when the first plant in the Rangoon area replaced the nation's first refinery built at Dunneldan in 1871 to process oil lifted from hand-dug wells. Crude supplies from Yenangyaung were brought down the Irrawaddy River in earthen jars lashed to bamboo rafts. By 1886, these sporadic supplies were supplemented from substantial supplies found by the first Burmah Oil Co.

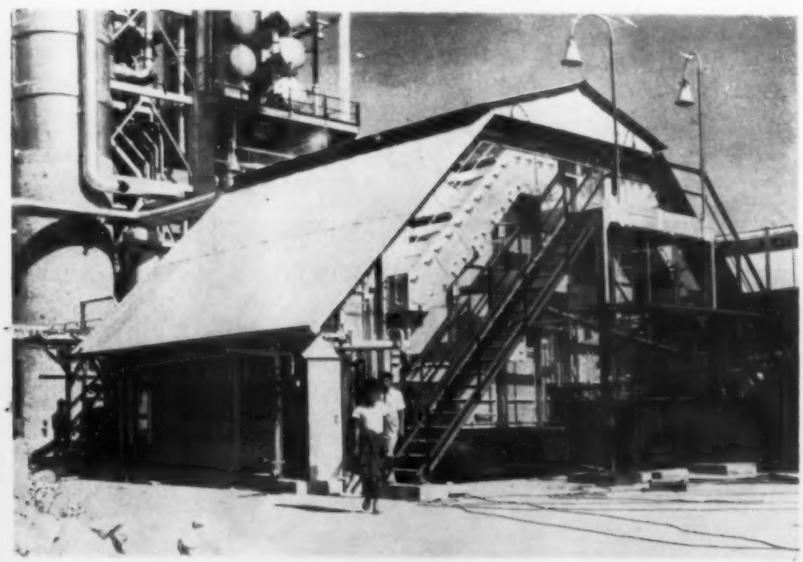
The first pipeline to Syriam was built in 1908, a distance of 275 miles. This line later was extended another 52 miles, and remained in service until "denial" orders caused its destruction in 1942 to prevent its use by the invading enemy.

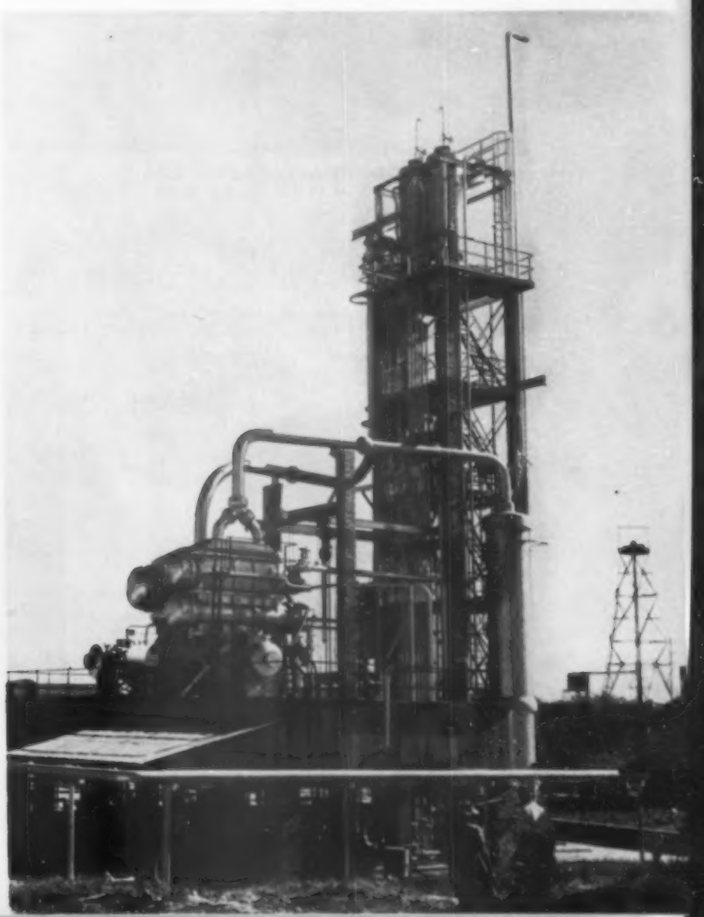
The pipeline still has not been put back in service. Oil for Syriam is delivered by barge trains operated by Burma's Inland Water Transport Board. At the close of the war, repairs were undertaken; and, by April 1946, the northern end of the line was ready for service and some of the central Burma wells were back in production. Later, parts of the line became inaccessible to repair gangs; Chauk plant was built first. It went onstream in January 1954.

Barge transportation on the Irrawaddy is not entirely satisfactory because of low water at certain seasons of the year. The transport board, however, has purchased pusher tugs and barges, four of which can carry 14,000 bbl of crude over the 300-mile river course at high water.

The new Syriam refinery is a joint venture of Burmah Oil Co. (1954) Ltd. and the government of the Union of Burma, under an agreement reached in November 1954. Within a few weeks after the pact had been signed, work began on clearing the rubble left after destruction of the old plant and the salvaging of usable items of equipment. Foster Wheeler Ltd. was selected as design and construction engineers on the job. The completed plant includes a Dobbs thermal cracking unit, plus atmospheric and vacuum crude distillation facilities, 40,000-lb-per-hour steam plant, candle factory, drum plant, product treating and blending facilities, as well as the usual auxiliary buildings and services. The refinery power plant supplies the town of Syriam, as well as the refinery, with electricity. Employment at the plant totals 1,500. END

Left: Two-stage crude-oil distillation unit designed for The Burmah Oil Co. (1954) Ltd.
Below: Heater for two-stage crude-oil distillation unit.
Right: Pressure-distillate rerun unit originally designed before the war by Foster Wheeler Ltd.—partly destroyed and rehabilitated by the same company for The Burmah Oil Co. (1954) Ltd.



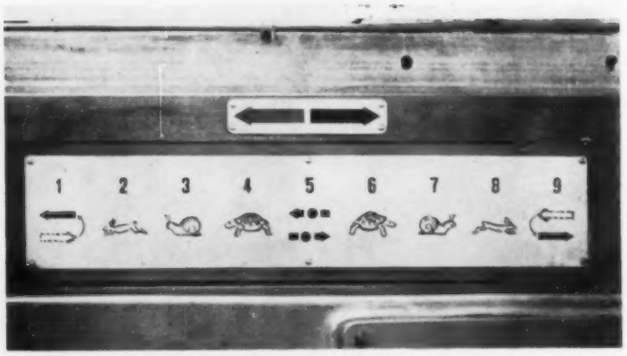


Reed activates Netherlands bit plant

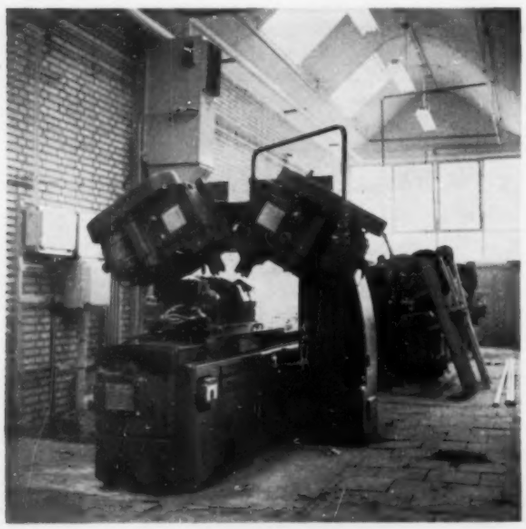
REED Roller Bit Co. (Nederland) NV has begun operations of its new manufacturing plant at Leiden, Holland. The plant will produce rock bits for the drilling industry, primarily in the Eastern Hemisphere.

Under the leadership of Fred Tyler, general manager at Leiden, a staff of machinists has been trained to operate the newly installed equipment.

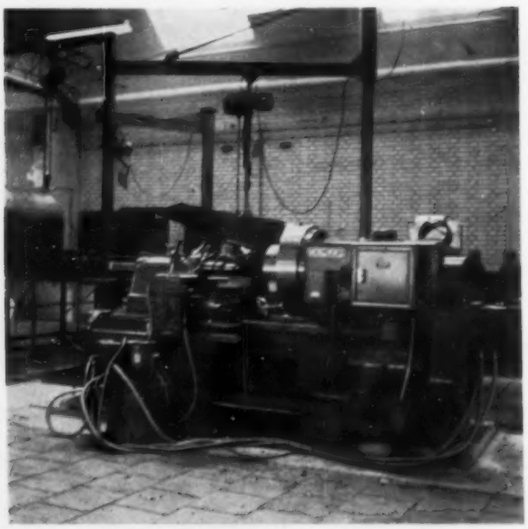
Plan of the company at present is to import rough metal parts for the Reed bits from the United States. All finishing and assembly work will be done at Leiden. Specially designed machine tools have been installed, some of which are unique in the number of operations performed at one time. An accompanying group of photographs illustrates some of these. END



Speed and direction indicators on the Olivetti milling machine, which need no interpreter in any country.



Milling machine specially designed by Reed and built by Olivetti in Italy to mill 120-deg. faces.

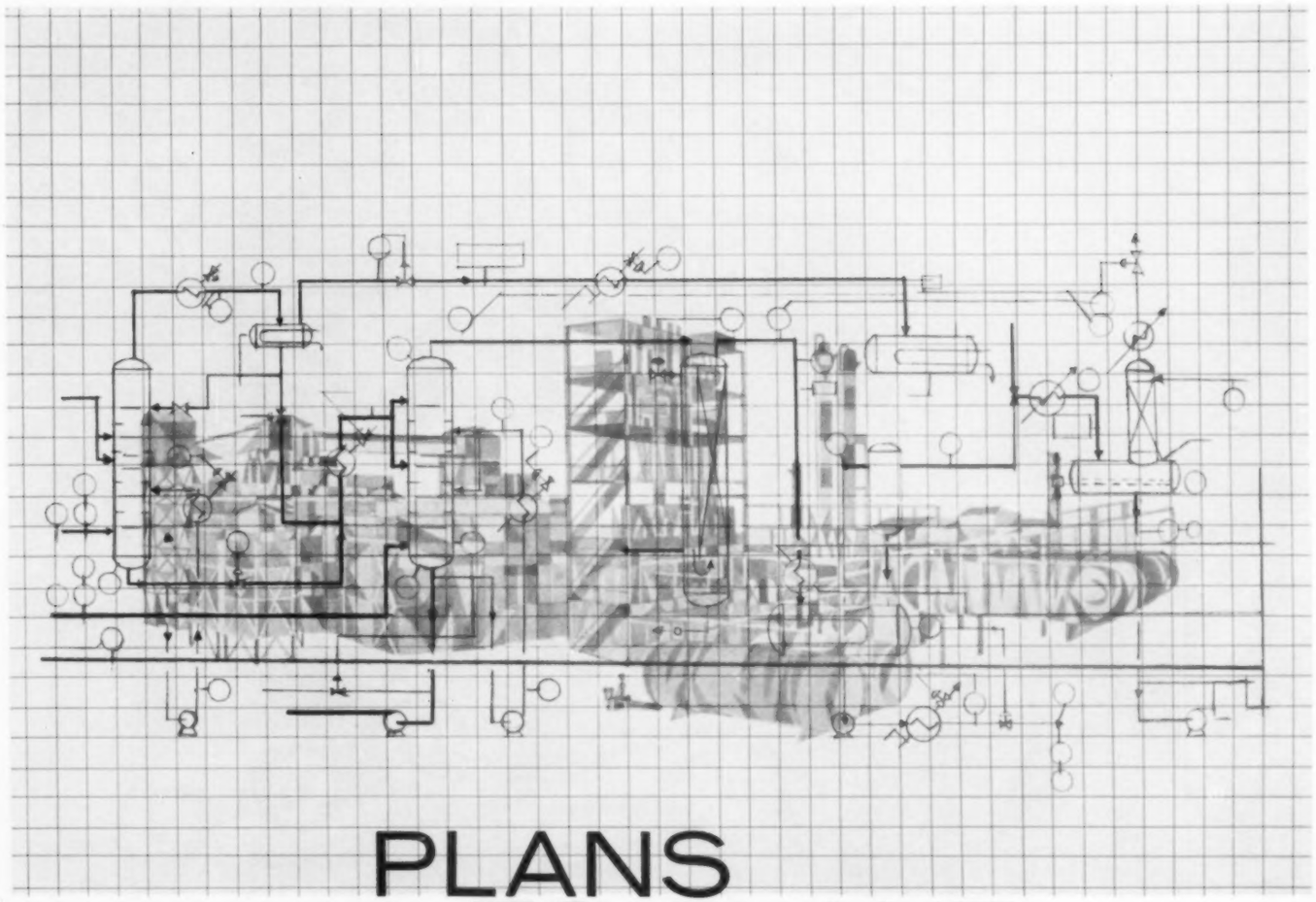


A Demoor lathe which turns, threads, and shoulders API connections.

Centering machine built in Holland to Reed's design.

Sandblasting is illegal in Dutch factories. Metallic parts are cleaned by shotblasting in this unit.

General view of factory: Copper-plater is in foreground, and Ipsen carburizing furnaces partly shown at right.



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Storage tanks on the Lanchow refinery site: Completion of the entire plant is scheduled for early 1958. Capacity has not been revealed, but is estimated at around 14,000 b/d.

China's oil progress

Vast deposits discovered recently have placed China among the world's richest countries in oil reserves. Their development is held back by lack of steel and by an economic system aiming at self-sufficiency.

by G. G. Rosu

One five-year plan and substantial economic and technical assistance from the countries of the Soviet orbit have helped China to become a potential oil power. At least one-third of China's surface (approximately 1.3 million square miles) is sedimentary basin. Discoveries made during the past four years in the northwestern region have enlarged its total reserves to such a degree that China might rightly claim to be today the third oil-rich country in the world after the USA and USSR. Proven reserves rose to almost 1.5 billion barrels (from an estimated 50 to 60 million barrels in 1950). Probable reserves amount to nearly 20 billion barrels, while ultimate reserves are virtually unlimited. Estimates of reserves and size of the basins are based mainly upon information gathered from preliminary investigations. A correct assessment of China's oil-field potential will become possible after the results of a serious exploratory program (planned for the next decade) have become available and evaluated. Exploration done prior to 1949 is of minor assistance, as total footage drilled up to that year amounted to a mere 130,000 ft. The deepest well on record is of 10,000 ft; hence the geological formations below this level are yet to be investigated.

In comparison with the reserves, production rates are disappointingly low. If the production yardstick is applied instead, China's place is at the bottom of the list of oil-producing countries. In 1957, crude output rose to 30,000 b/d, which is seven times higher than the preplanning level (1952); yet this quantity sufficed to cover a mere third of China's rationed oil consumption. A target of 100,000 b/d to 120,000 b/d had been set for 1952, and 500,000 b/d for 1967—the last year of the second and of the third Five-Year Plans, respectively. However, only half of the rationed consumption is expected to be covered from domestic production during the second plan, while self-sufficiency will not be attained before 1967. Briefly, it will take another decade before production catches up with consumption.

However impressive these targets may appear, they mean very little when related to China's population. Indeed, in 1967, the annual per-capita consumption will rise to a quarter of oil output, but this will be then—as it is now—the lowest consumption level in the world. Consumption of coal and electric power (of which China produced last year 113 million tons and 15.9 billion kwh) is strictly rationed, and also because of short supplies.

Shortage of tubular goods, drilling equipment, and investment funds constitutes the limiting factors which restrict production. Total footage drilled between 1950 and 1957 (for both exploration and development purposes) amounted to approximately 2,500,000 ft. Divided into the average drilling depth which prevails in China, this means a maximum of 700 wells drilled in eight years. At this drilling pace, it will take several decades to bring the main deposits of the Northwest to a full production level.

Following is a review of the prominent discoveries made during the first Five-Year Plan (1953-57); the planned targets and their fulfillment; the organization and efficiency of the geological services; and of refining capacity.

During the past five years, all activity was concentrated on the Northwest—which includes the Shensi, Kansu, and Tsinghai provinces, as well as the Sinkiang-Uighur autonomous region. The results achieved by

this activity in the northwestern basins are analyzed below—going from east to west.

In Yenchang, the main producing field in the Shensi basin, drilling activity was resumed after 1950, under Soviet guidance. Before the last war, some 40 wells were drilled in this field at depths of up to 3,000 ft. Production started in 1934, but soon afterwards it was stopped because the field was thought of no commercial value. After 1951, drilling was resumed on the Yenchang, as well as on the adjoining Yenan and Yuanping fields, which had been prospected prior to 1940. It was officially reported that several oil-bearing structures have been discovered, and many gas indications have been located in the Ordos region. Crude production of the Shensi basin may total 5,000 b/d, which is a trifle compared with its potential. Of all China's oil fields, Shensi is the only one crossed by a water course, the Yellow River. This natural advantage cannot be used before the completion of the flood-control program, which provides for the construction of 46 dams over a period of two to three decades. Afterwards, vessels of up to 7,500 brt, it is said, will be able to sail from Lanchow to the Yellow Sea.

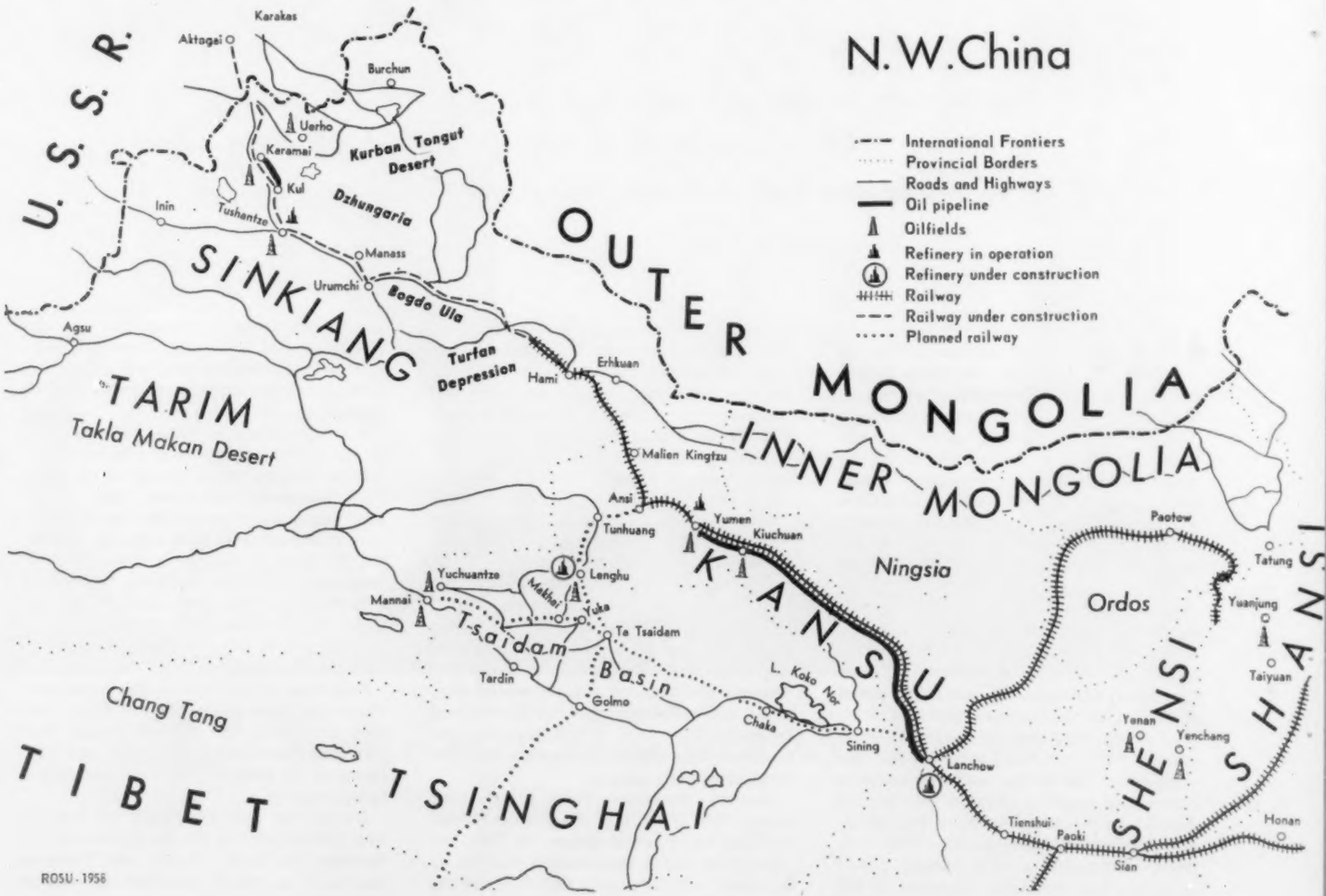
The Kiuchuan basin in Kansu is a low-land strip of marshes, grassland, and alkaline flats, covered by unstable loess into which are cut numerous canyons and escarpments. This area is innundated every spring by sheet floodings. The basin extends from the Mongolian arc in the south to the outer Mongolian frontier in the north. Exploration carried out during the first plan revealed that the area of this basin is of nearly 70,000 square miles, i.e., five times larger than the surface indicated by earlier estimates. According to official sources, there are almost 100 prospecting and drilling teams at work on the Kiuchuan basin. Good oil shows have been reported around Kiuchuan town (a fertile oasis transformed into an oil workers' settlement), and along the foothills of the Chilian Mountains northwest as far as Malienkingtzu and Erhkuan. All these shows are located along the Lanchow-Aktogai rail line. Chinese geologists hope to find a "second Laochunimiao" in the northwest part of Kansu.

Kiuchuan's main producer—the Laochunmiao, located in the Yumen area—is still yielding the bulk of China's crude-oil-production. Yumen's share in the total production rose to 80% in 1942 from 63% in 1939. During the first plan, its share in the total output resulted as follows:

Year	China's total crude production (barrels per day)	Yumen's share in the total (barrels per day)	Percentage of total
1952	8,600	4,560	53
1953	12,270	6,460	53
1954	15,560	7,100 (a)	46
1955	19,100	7,600	40
1956	23,600	10,260	44
1957	30,000	15,000 (a)	50

(a) Own estimates.

Compared with Kiuchuan's proven reserves of nearly 500 million barrels, this production rate is insignificant. Many wells are, presumably, capped owing to lack of transportation facilities. Since July 1955, Yumen has been linked to Lanchow by railway. A pipeline 548 miles long, running along the railway, was to be completed during 1957. Larger oil quantities may then flow to Lanchow and, thence, be forwarded to the oil-hungry east coast and South China. Yumen's production will rise in the near future, due also to application of secondary-recovery methods. Five water and one gas-injection stations were built in this area since 1954. It is at Yumen that China's



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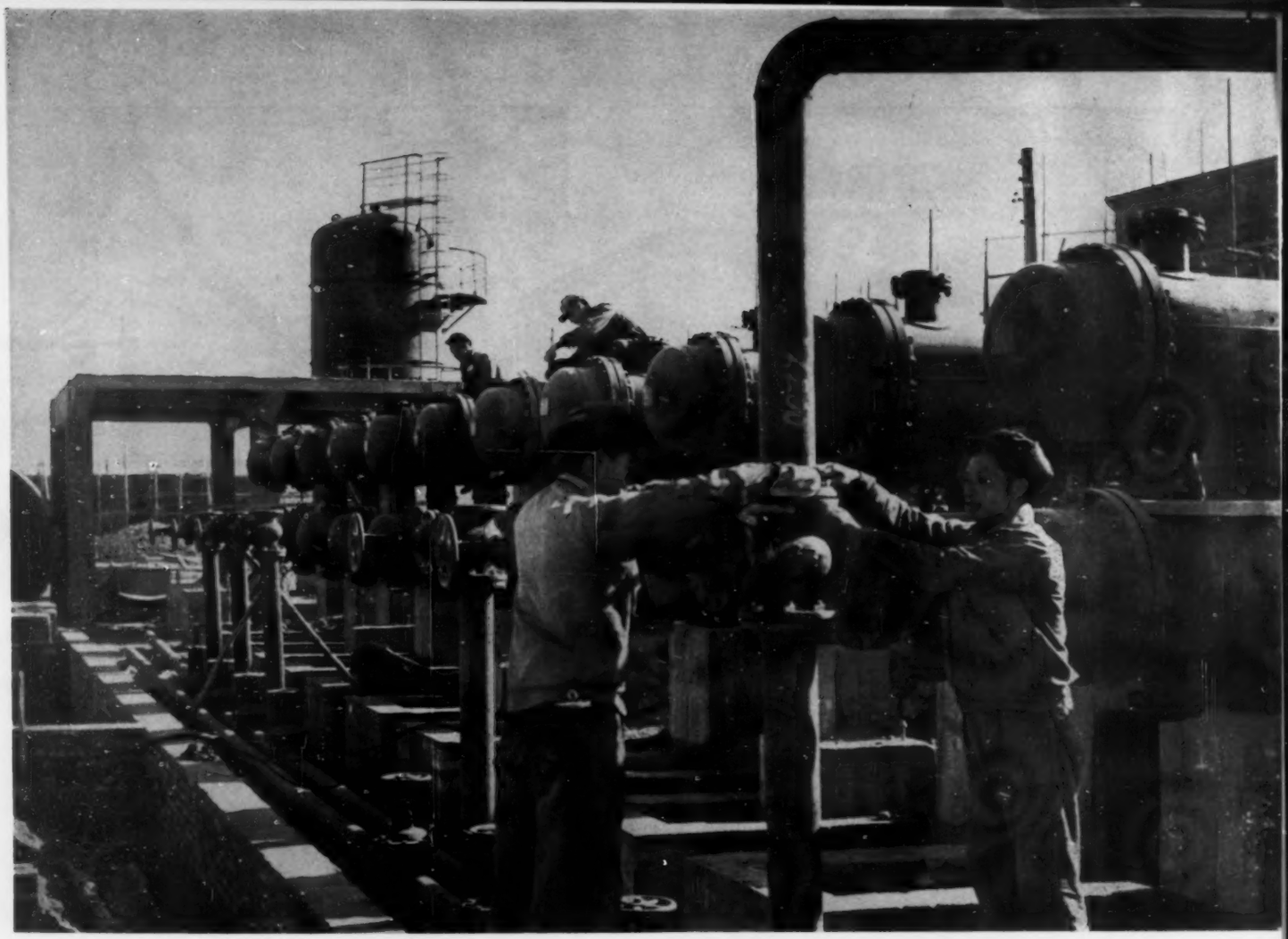

Electric desalting equipment, Lanchow refinery in northwest China.

deepest well was drilled (almost 10,000 ft) and where the first well drilled at an angle was completed.

Production costs of Yumen crude are high. On the one hand, its cost level is swelled by the initial investments in housing, farming areas, social amenities, and other constructions which are a prerequisite for oil development. On the other, due to lack of mechanization, the manpower pool here is disproportionately large. For instance, in 1952, 11,000 technicians, workers, and administrative personnel were on the job at Yumen; while, in 1956, their number rose to 42,000. Production rate per man per year was thus on the order of 151 bbl in 1952, and only 90 bbl in 1956. These results demonstrate a very low productivity.

Yumen crude oil has a 32.5 API gravity, a 15% wax content, and yields 20% straight-run gasoline. Present production per well may average 60 b/d to 70 b/d, but much higher rates may be expected after the opening of the Yumen-Lanchow pipeline.

The Tsaidam basin, in Tsinghai province, is a plateau landlocked between the Chilian Mountains in the north and the central range in the south. Once a huge inland sea, it is now a swampy desert covered with alkaline soil and loess, extending over 82,000 square miles at a 9,000-ft altitude. In Mongolian language, "tsaidam" means "salt marsh." And, indeed, the salt deposits discovered recently here are estimated at over 26 billion tons. Many dried-up lakes are covered with crystallized salt in layers up to 52 ft thick. Prospecting work carried out during the past three years has revealed also the existence of rich deposits of many nonferrous minerals, as well as of asbestos, graphite, borax, and bauxite. In addition, the stretch between Tsaidam and Yuka shows frequent coal outcrops. Coal mining has begun at Yuka where, according to official reports, a 125-ft-thick seam was discovered a few feet below the surface.

Search for oil started on Tsaidam in 1954. Oil was first found at Yuchuantze, in the vicinity of Mannai, where a dozen flowing wells had to be capped until transportation could be provided. For the past four years, exploration has been carried along its edge —from Ta Tsaidam to Tardin, Mannai, and up to Lenghu, the northernmost point of the basin. Large deposits of shale of a high oil content have been also discovered around Lenghu. Several wells drilled in the latter area struck oil, and further exploration ascertained that Lenghu field has commercial value. Its development must await completion of the Ansi-Tsaidam railway, scheduled to occur during the second plan. After this line has been completed, the main producing fields of the Kiuchuan and Tsaidam basins will be linked together, as well as with the Dzhungaria basin.

The richest strike made on Tsaidam so far is Mannai, where several deposits (one of which is, reportedly, 400 square miles in extent) have been discovered. Geological teams comprising some 400 workers were sent further south into the sandy ridge of the Chiman Tagh, but absolute lack of water has apparently foiled any activity in this wilderness—at least for the time being.

The government is determined to develop Tsaidam into China's third oil base within a short time. Armies of regular soldiers and of workers are engaged in transforming this untamed and sparsely populated region into a new industrial region, but lack of water and of building-materials deposits are serious and permanent obstacles. Food is now being produced locally, mainly in the Makhai small but fruitful oasis. Transportation is exclusively by trucks, of which 2,000 are reported at work in this area. Highways and roads are being built around and across the basin; and a new railway linking Lanchow to Sinning, Chaka, Makhai, and Mannai will be completed during the second plan. Blueprints are ready also for

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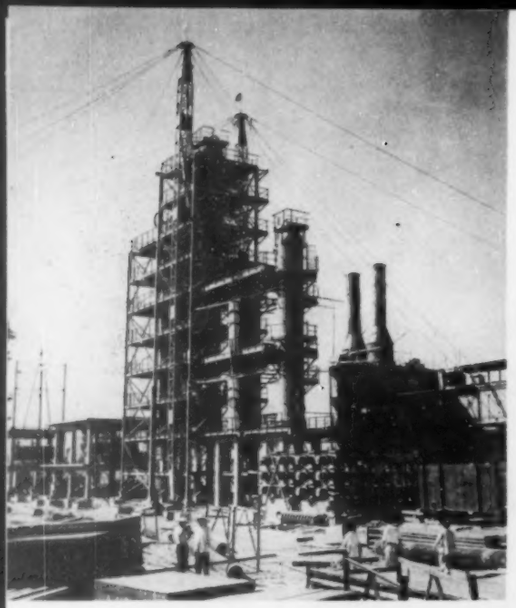


Vacuum-distillation facilities at the Lanchow refinery, now under construction in northwest China. Lanchow is an industrial center—scheduled to become China's main refining center as well. The refinery has been under construction for two years, and completion data is set for early 1958. Cracking facilities are included. Caption states 413 miles of underground piping are being laid for the plant, which will have 18 workshops and will produce gasoline, kerosine, and diesel oil.

a second railway which would branch off at Ansi from the Lanchow-Aktogai line, cross the basin from north to south, and follow the route Ansi-Tunhuang-Lenghu-Makhai-Ta Tsaidam. Still another railway is planned for a later date from Ta Tsaidam across the Tibet plateau to Lhassa.

New towns are being built at Ta Tsaidam (which is planned to become an oil center and a railway link), at Yuka and Mannai. During the past four years, Mannai has been developed into an exploration center whence are directed the activities of 23,000 workers employed on four adjoining drilling areas. A new refinery is under construction at Lenghu. The outlying location of the Mannai oil fields will require the building of a refinery in this area as well—probably at a later date.

The Dzhungaria basin, in the Sinkiang-Uighur autonomous region, is today, according to preliminary estimates, China's largest and most prolific oil deposit. In these western highlands there are, in fact, two or even three separate basins: Dzhungaria, Tarim (in the Takla Makan depression) and a possible smaller basin in the Turfan depression. Compared with the highlands' average elevation of 10,000 ft, Tarim reaches 2,574 ft, and Dzhungaria 627 ft at their lowest points. Turfan is below sea level. The region is enclosed by the Altyn Tah Mountains in the south, the Altai range in the north, while the traversing Tien Shan is separating Dzhungaria from Tarim.

Dzhungaria is a pebbly, sandy wasteland devoid of water, with sporadic vegetation and hardly any inhabitants. It lies 300 miles from the nearest ocean. This explains its dry climate. Mineral wealth, however, overcompensates its desolate and unfertile surface. Large deposits of oil have been located on its southern and western flanks. Their development cannot begin before the completion of the Lanchow-Aktogai railway (track is being laid, at the present time, on the Hami-Urumchi portion).

Oil was first struck here in 1935 by a Sino-Soviet team, at Tushantze which is located on the southern edge of the basin, halfway between Urumchi and Inin. Small quantities of oil were extracted three years later. After a decade of abandonment, the (now disbanded) joint Sino-Soviet Oil Co. resumed operation here in 1950. Wells are drilled on the foothills and on the slopes of the Ghenghis Khan Mountain.

The richest strike in Dzhungaria was made in October 1955 at Karamai (which in Uighur language means "black oil"), located some 100 miles northwest of Tushantze. By the end of 1956, 20 exploratory wells were flowing at Karamai at the rate of 70 b/d to 150 b/d. Dzhungaria's geological structure is similar to that of the Russian (known also as the East European) platform. Karamai itself is a stratigraphic trap in a Jurassic formation. There are frequent oil seepages and abundant tar over large sites at the surface. Drilling conditions are favorable: Absence of high-pressure subterranean water and of cavings-in permit the use of low-gravity mud. The oil-bearing stratum is at shallow depth, which accounts for further material savings. Karamai crude oil has a congelation point of 37 F below zero, a high proportion of light constituents, and is an excellent raw material for producing high-grade lubricating oil. Exploratory drilling is carried out around Karamai with a view to assessing the size of the deposit as well as for ascertaining whether oil migrates from the "Tien Shan deep" which is situated at a lower level than the Karamai platform.

Another structure was discovered in 1956 at Uerho, 60 miles northeast of Karamai, which is thought to be as rich as the latter. Inasmuch as both deposits have a similar geological structure, the inference is that the entire area west of the Mannas River up to the Sino-Soviet border—covering an area of 1,500 square miles—could be one oil deposit. There are 4,000 workers active on the building sites of Uerho alone.

The Kurban-Torgut desert—an area of 10,000 square miles of sandy dunes—has been explored since 1956 apparently with encouraging results. If oil is found there, then the compelling conclusion is that the entire Dzhungarian depression, an area of 57,000 square miles, is oil-bearing.

As in the Middle East, lack of water is a permanent handicap which, in the long run, may thwart the plans drawn for the industrialization of Dzhungaria. To supply Karamai, water is carried by trucks from the Manass River, 28 miles away. Water is needed, first and foremost, for irrigation to reclaim arid lands so that enough food may be grown locally to feed the large population required for the industrialization of this wasteland. Two pipelines are being laid to carry water across the desert. They will probably stretch from the Irtysh, Urungu, and Manass Rivers to Uerho and Karamai; however, the water volume of these rivers is very small. Unlike the Middle East, Sinkiang is hundreds of miles way from seas and oceans; hence, the only solution is overland transportation, the high costs of which will permanently burden the oil bill. This is Dzhungaria's second permanent handicap.

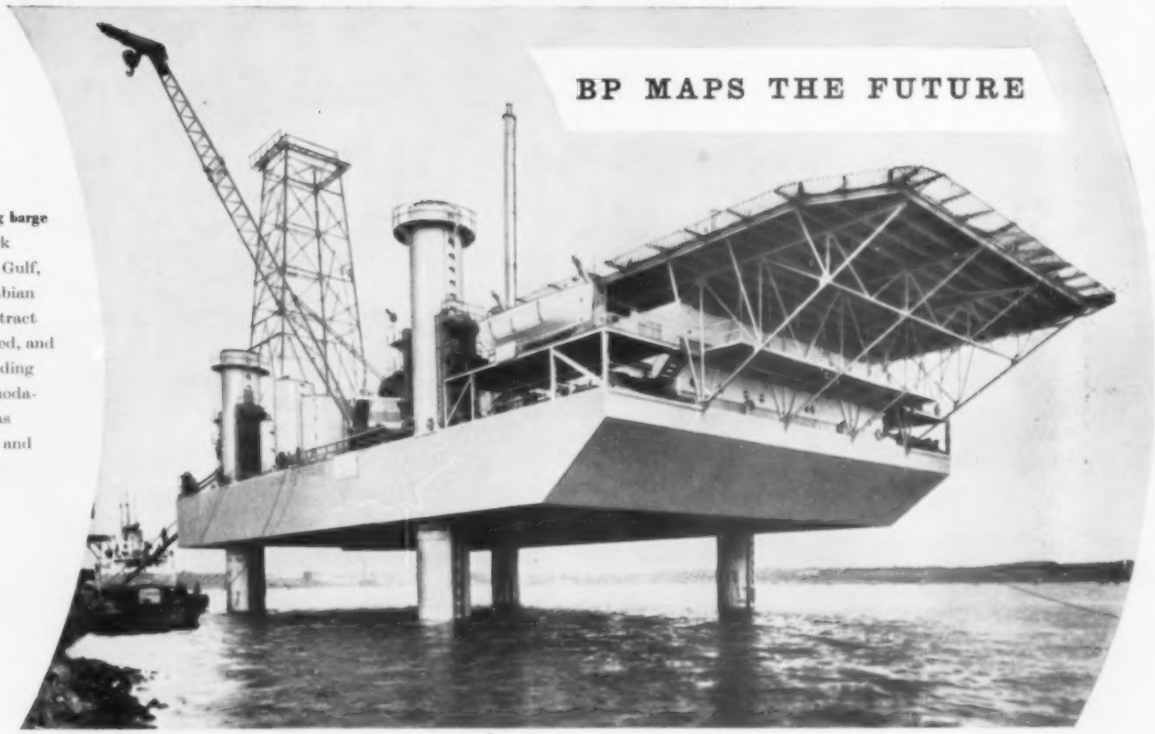
Human energy is not spared for rendering Dzhungaria accessible by rail and motor cars. Some 200,000 demobilized soldiers, organized in a "construction corps" which is run on military lines, are toiling around the clock to tame this wilderness. They have already built an impressive network of highways and access roads.

The small Karamai production is carried by trucks to the Tushantze refinery. To shorten the distance, a 34-mile-long pipeline is being laid to carry oil to temporary reservoirs built at Kul. Much of the equipment, trucks, tubular goods, etc., needed for the development of Dzhungaria is being supplied by the Soviet Union. These goods are shipped from Karakas, on Zaidan Lake, upstream the Cerny Irtysh to Burchun on the Chinese territory, and thence carried on highways to Uerho and farther south. After the completion of the Urumchi-Aktogai railway, Dzhungarian crude oil might be supplied across the border to the eastern districts of Kazakhstan which are poor in oil resources.

One of the world's most remote oil refineries has now been built in Sinkiang, in China's Tsaidam basin—a desolate land of marshes 9,000 ft. above sea level. A few years ago its meager wealth consisted only of pelts and furs; but the Chinese now regard the region as a storehouse of potential mineral wealth—including oil. With no railroads, the refinery must ship its products by trucks which either follow the mountainous route from Lanchow direct to Tsaidam through Sining, or take the route from the railhead in Yumen. Both routes are used daily by hundreds of trucks which carry oil-drilling and mining machinery to the rapidly growing colony in Tsaidam.

Tarim, in the Takla Makan depression, is Sinkiang's second basin. This is a desert of 218,000 square miles, completely barren and inaccessible. Oil shows have been noticed for a long time along its northern fringes, from Turfan to Aqsu. Some prospecting had been carried on earlier along this border, but no results are yet known. Future exploration activity on Tarim will encounter far greater natural obstacles and aridity than anything encountered so far

BP MAPS THE FUTURE



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More hopeful still seems to be the Turfan depression, which is locked between the Bogda Ula and Qurup Tagh Mountains—where the highest temperature in China is being recorded, 118 F. Exploratory drilling may begin here, but not before the completion of the East-West railway, i.e., during the current Five-Year Plan.

The Tibetan plateau, encircled between Himalaya and the Kunlun, is the least known of all China's geographical regions. Mixed geological teams were prospecting along the Yalutsangpo (Brahmaputra) valley in 1952 and 1953. They are reported to have discovered vast resource of nonferrous minerals, but no oil findings have been announced yet. Tibet's northern region, the Chang Tang, has not been prospected at all. Intensive exploratory activity is planned on the whole Tibet plateau during the 1958-62 period, when also the Tsaidam-Lhassa railway should be started.

Exploration is being carried out also in southwestern China, in the Szechuan, Kweichow, and Yunnan provinces, but on a modest scale. These provinces are very poorly supplied with fuels and energy. As officially announced, 27 teams—comprising some 300 geologists—have been exploring the Szechuan basin since 1954, particularly the Permian limestone on its northern part, which seems to be very promising. But the only crumb of comfort derived so far from these efforts is the discovery of three gas fields, the location of which has not been yet disclosed. The Szechuan basin, which covers approximately 85,000 square miles, has been perforated for the past 2,000 years by numerous brine wells, some of them as deep as 4,000 ft. Oil wells drilled prior to, as well as after, World War I have been producing a few barrels per day from several horizons in a Cretaceous formation. Szechuan crude oil has a paraffin base and a 20 API gravity; yet lighter crude oils are also extracted from this area.

Hopes for oil findings are pinned on the formations underlying the plains between the Yangtse and Huai Rivers. However, a lot of spectacular discoveries ought to be made in the Southwest to solve China's unfavorable distribution of oil resources; for almost 80% of its population lives in the rainy regions, i.e., along the eastern coast and south of the Yangtse. Absence of local oil deposits of any importance is alleviated by oil products from Yumen, transported on rail, as there is no navigable watercourse to link the dry but oil-rich Northwest with the rainy, oil-poor but overpopulated South and Southwest.

China's industrialization plan, which aims at attaining self-sufficiency within a 15-year period (1953-67), required from the outset an intense geological activity all over the country with a view to resurveying the known mineral deposits, searching for new resources, and selecting proper sites for localizing new industries, railways, dams and reservoirs, etc. Not more than a few dozen good geologists were available in China in 1949 to cope with these tremendous tasks, and most of them were doing academic work. A year later, 29 surveying teams of a few scores of persons each were assembled, but only a few of them were provided with adequate geophysical or drilling equipment.

The establishment of the Ministry of Geology in 1952—which took over the direction of the entire geological activity—coincided with the beginning of a program for mass training of thousands of geological workers. In the same year, two new geological institutes were founded: one in Peking, the other in Changchun. Training facilities have also been expanded so that now there are geological faculties at the Peking, Tsingtao, Nankai, Dairen, and Northwestern universities. Further training is provided in five colleges of geology, as well as in several special schools, which train students in topography, geophysics, and drilling techniques. The backbone of the earlier teams was provided, however, by 2,000 geological workers, recruited in a hurry from among the demobilized soldiers, and sent for training to schools in the Soviet orbit hence they returned in September 1953.

The first graduates were organized into 80 mixed surveying teams—some of them several hundred members strong, and better supplied with equipment. They have been sent out in the fields to fulfill the directives issued by the First National Petroleum Conference, held in September 1954, which called for a geological crash program. Their first task consisted in general pioneering work which covered 21 provinces and areas.

Exploration for oil received a further push in 1955 with the establishment of a separate Petroleum Ministry which immediately inaugurated a special program for oil search. A year later no less than 30,000 geologists, trained prospectors, technicians, and workers were engaged, as officially reported, in oil-search activities. The results of their work are mirrored in the series of discoveries in the northwestern basins, discussed above.

But these strenuous efforts and training programs are not free of drawbacks—outstanding among which is the quality of training. Almost three-quarters of the team workers are either students who, after a couple of semesters, were sent into the fields where they continue their training in evening classes run by whatever technicians are available on the spot; or they are high-school graduates who took a three-month course in training classes run by the geological bureaus of the administrative divisions of the Geology Ministry. On the other hand, teaching cadres are, admittedly, below the required level, and most curricula lay too much stress upon handling, surveying, and drilling equipment and too little upon basic training in geology, tectonics, mineralogy, paleontology, etc.

Graduates of such short courses of specialization are not fit for either teaching or research. Most of them are incapable of independent work, as well as of using the economic yardstick in their field activity. Negligence of basic geological research and of training people capable of interpreting field data is slowing down progress in the fields. All leads for prospecting derived from earlier geological studies have been used up. For these reasons, the geological institutes see themselves now compelled to initiate programs for basic research while the geological faculties are beginning to train geologists capable of doing research.

Essential help in training, direction of field activity, equipment supply—even in blueprinting China's training and research programs—has come from the Soviet Union and the eastern European countries. Their experts could be seen everywhere: in the fields, in ministries, as well as in research institutes and universities. A delegation of Soviet geologists, headed by P. Antropov, the USSR Minister of Geology and the Conservation of Mineral Deposits, arrived two years ago in China to help plan the geological and drilling activities and organize research and training. With their assistance and equipment, Chinese teams are able now to carry on aerial reconnaissance, aerial magnetic surveying, geophysical and geochemical prospecting; they have even learned how to use radioactive isotopes in prospection and in gauging drilling holes. China's geologists are bracing themselves now for a large-scale exploration program to be carried out during the current plan. Appropriations for prospecting activities and geological research amounted in 1956 to the equivalent of $233 million, but official sources intimated that larger amounts will be made available in the future.

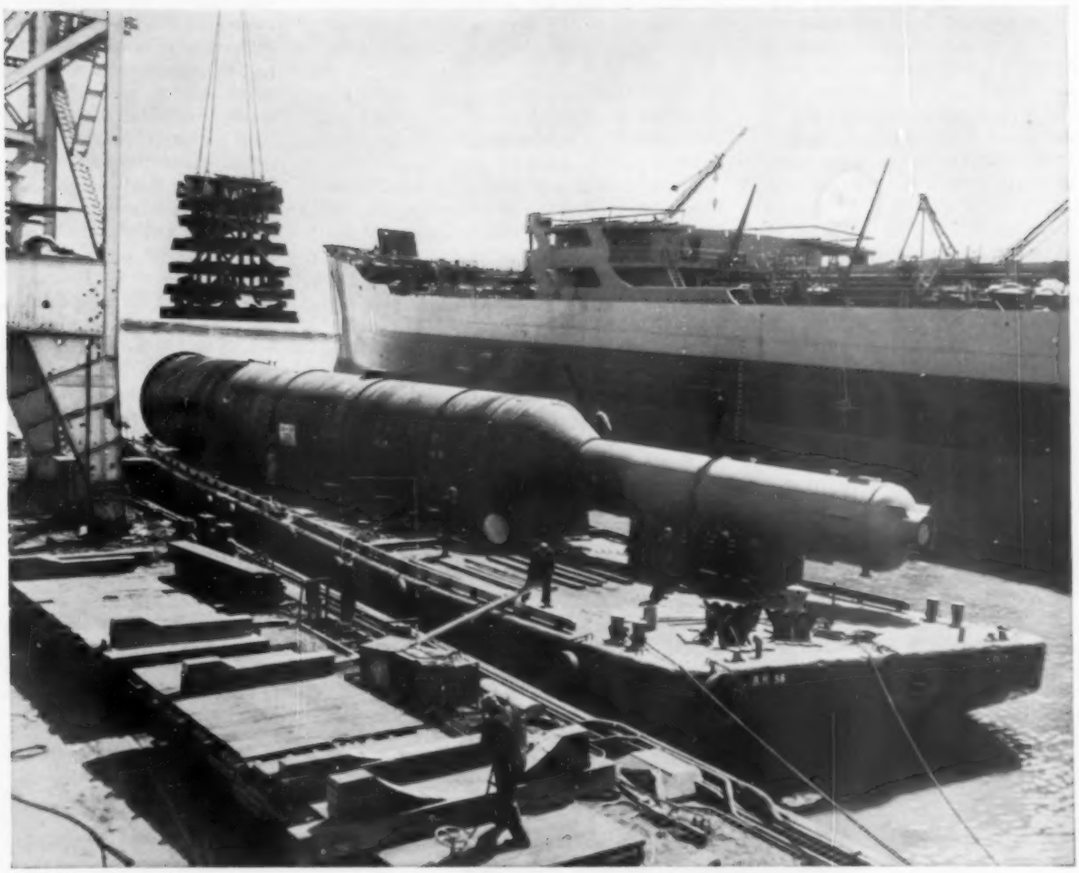
Processing plant capacity is growing, but only proportionate to the planned crude production levels. The following refineries are in operation at the present time:

The Yumen refinery is still China's largest unit. Its throughput capacity was enlarged to approximately 8,000 b/d in 1955, from 3,000 b/d in 1950. Primary distillation and cracking installations were supplied by the Soviet Union, East Germany, Czechoslovakia, and Romania. It is processing 16 products—among them gasoline, lubricating oil, wax, vaseline, etc.

The Tushantze plant, built in 1943, was restored to operation under the administration of the Sino-Soviet Oil Co., and enlarged by a cracking installation, power plant, oxygen plant, repair workshop, etc. This refinery is now in process of further enlargement.

On the east coast, the small distillation units at Dairen, Chiuhsien, and Shanghai (each of between 2,500 b/d and 3,000 b/d throughput capacity) are processing whatever quantities of Yumen crude oil could be supplied overland.

Lanchow is slated soon to become China's main refining and oil distribution center. A new refinery has been under construction here since 1955. It was slated to go onstream in part during this year after the completion of the 548-mile Yumen-Lanchow pipeline. Its capacity has not been disclosed, but officially it was announced it will have cracking installations, 18 workshops and storage tanks—all supplied by



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In addition, a factory for manufacturing drilling equipment is under construction at Lanchow. After 1958, oil products will be sent from this center overland to southwestern and southern China.

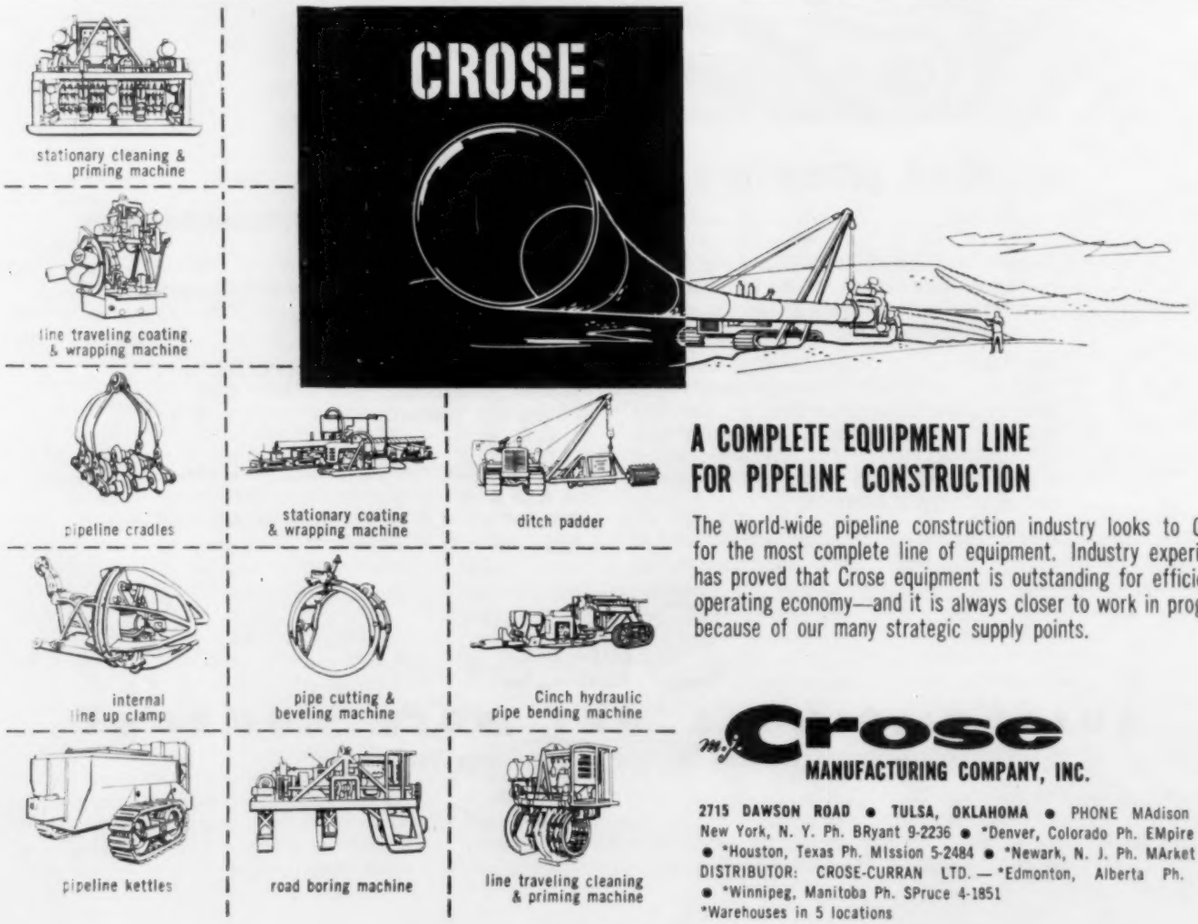
The supply of northeastern China will continue to be derived from the shale oil processed out of the abundant shale deposits at Fushun. Up to 1955, China's shale-oil production, did not exceed 6,100 b/d, but rose to 10,100 b/d after refinery No. 2 was reconstructed and enlarged—mostly with Czech installations and technical help. Capacity of refinery No. 1 is 6,100 b/d; and that of refinery No. 2, 4,000 b/d. Failure to open up the shale mines east and west of Fushun has resulted in raw-material shortages which, in turn, caused refinery No. 2 to be closed down since December 1956 for part of its capacity (specifically, 26 distilling vats). Shortage of shale will not be improved before the end of 1958—or even later; hence total shale-oil output this year will be below the maximum capacity available.

Appreciable new reserves of bituminous coal have been recently discovered, in the Fushun area, which could be mined in open pit. This coal contains 40% volatile matter, 13% coke, 10% ashes, 8% water, 0.7% sulfur, etc. At low-temperature distillation, it yields 60 bbl of synthetic liquid fuel per 100 tons of coal. This bituminous coal will be used as raw material in a synthetic-fuel plant to be erected at Fushun, with installations to be supplied by the Soviet Union under the terms of the Sino-Soviet agreement for economic assistance of April 7, 1956. With this addition, China's total shale-oil and synthetic-fuel production capacity may be up to 15,000 b/d by 1962. Further expansion in oil-from-coal production is blocked by shortage of steel and electric power. The latter has serious restrictive effects owing to the removal of Manchuria's power-generating plant by Russia after 1945.

China does not, and cannot, aspire—at least for another 15 years—to become an "oil power." A spectacular rise in production is neither planned nor feasible. The limiting factors are steel and investment funds, of which there is great scarcity. An abundance of both items is necessary not merely for surfacing oil and building refineries, but—first of all—for taming the physical geography of the desolate and inaccessible regions in which oil has been discovered, as well as for building transportation means.

Crude steel production reached 5.5 million tons last year, and a target of 10.5 to 12 million tons has been set for 1962. China is depending on imports for machines and installations required by its planning in proportion of 40%, and of 30%, for the respective years. These, as well as better-quality steel, could come from the Soviet orbit alone—which, lately, has been less willing to grant China large long-term credits for its import needs. The shrinking supply markets have compelled China to strive—like the Soviet Union in its inceptive planning—to build first an integrated industrial system, i.e., to balance raw-material supply with processing and transportation capacities in all industrial sectors. The petroleum sector is subject to the same balancing process; prospecting has taken an initial lead, but development is kept in line with the railroad construction scale, and retarded by the limited funds earmarked for building new steel plants.

The key to progress is, of course, capital; and the conditions under which the investment rate is accumulated in China are hardly conducive to a spectacular advance. In a backward country of 3,800,000 square miles, where 500 million people eke out a living from land cultivation, capital accumulation is bound to be a very slow and hazardous process. Early in 1950, China's total industrial assets (handicraft included) were valued at 9.4 billion yuan ($1.00 = 2,367 yuan at the official rate of exchange). By 1955, the total rose to 24.5 billion yuan, but in this figure were included also all industrial installations delivered on credit by the Soviet Union (which alone granted China credits valued at 5.3 billion yuan during this period) and by the eastern European countries. The investment rate was 6.5 billion yuan in 1953, and it rose to 14 billion yuan in 1956. The natural disasters which ruined the crops caused a reduction of this rate in 1957 to only 11 billion yuan. Consumption already has been reduced to the level of biological survival, and earnings are too low to afford any surplus for savings. Briefly, there is no safety margin left in the consumption sector on which to fall back in case of stringent need for additional capital. END



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New Services • • • New Tools • • • New Methods • • • Outstanding Results

Powerful M-3's Perforate Deep Well for 1296 B/D

McCullough M-3 Bullet Guns Get Production After Jets of Another Make Fail

This deep well in New Mexico had previously been jet perforated by another service company without results.

Producing formation was a 26′ zone between 11,977′ and 12,003′. 5½″ OD 20 lb. casing had been cemented through the zone.

McCullough was called to reperforate the well with M-3 Bullet Perforators. 156 improved ½″ Ogival Bullets, six per foot, were fired in the 26′ interval.

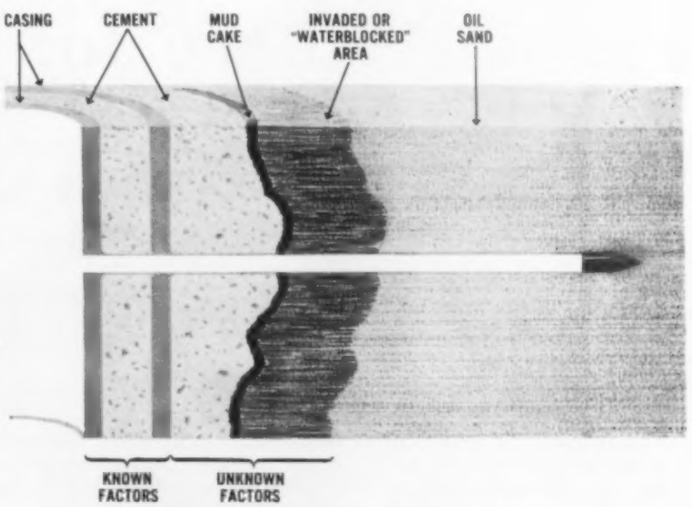
Resulting production was 1296 barrels of oil per day. Operator was very pleased with the good results of the job.

McCullough M-3 Bullet Guns are made to shoot harder—to obtain deepest penetration under severe well conditions. M-3 Guns will get production or increase production even after others have failed.

The job shown above is certified to be a true field report of service rendered.

For full information on the McCullough M-3 Bullet Perforator, write to:

McCullough Tool Company
5820 South Alameda
Los Angeles 58, Calif.



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"PUT THE SHOTS WHERE THEY COUNT"—DEEP IN THE OIL ZONE

M-3 Guns are designed to obtain the deepest possible penetration. They have the extra firing power necessary to pierce the known thickness of multiple casing strings with cement in the annulus—to penetrate through an unknown thickness of cement outside the casing—to get through the variable depth of a mud cake and "water blocked" area—to penetrate deep out into the virgin oil zone.

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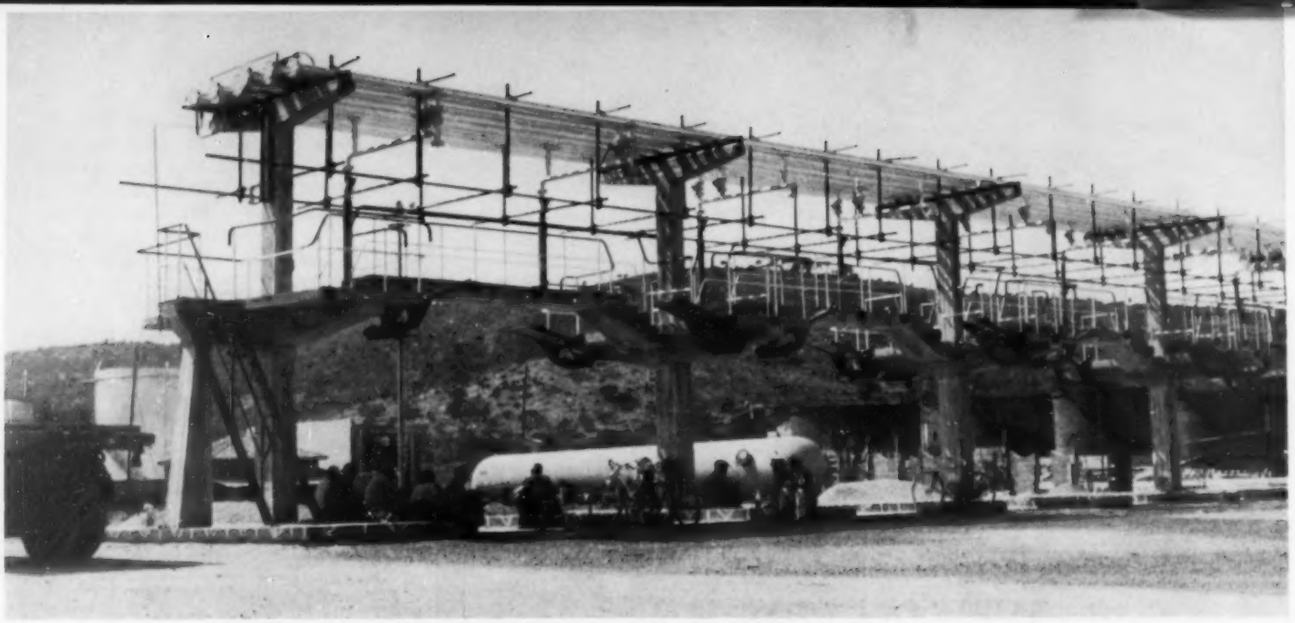


Truck loading rack is designed to load simultaneously 17 tank trucks with finished products.

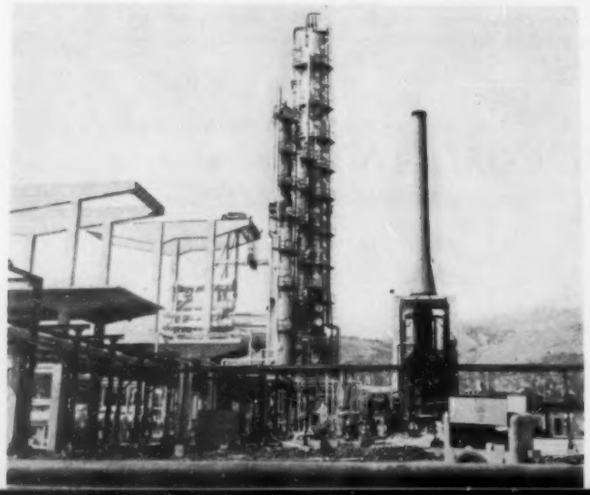
GOLFO—
a new refinery for South Italy

An independent Italian company has erected a 30,000 b/sd refinery between Rome and Naples which has been designed for product recoveries matching demand in the region.

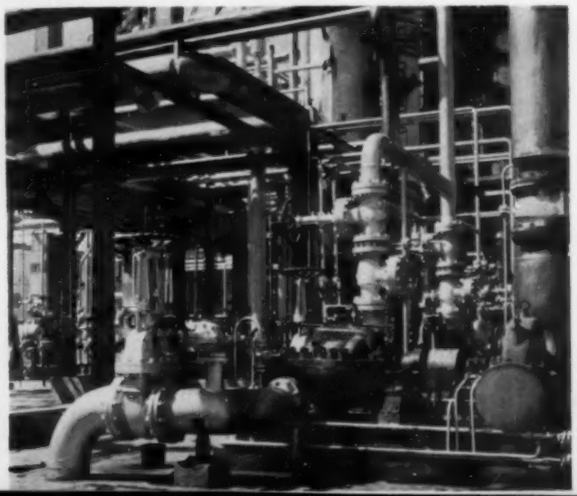
HALFWAY between Rome and Naples, on a flat 38-hectare area between the Thyrrenian Sea and picturesque hills, a modern oil refinery is being completed which will give a new lift to the underdeveloped economy of South Italy: its name GOLFO. Owned by an independent Italian group, the refinery has an overall crude capacity of about 30,000 b/sd (1.3 million metric tons per year).

The plant is connected to the Mediterranean Sea through a series of crude and products pipelines about one mile long. One 20-in. crude line is now operating, and may be doubled in the near future. Two 10-in. lines are provided for gasoline and gas-oil offshore loading; one 8-in. line for jet fuel and kerosine. One 10-in. line has been laid

Topping unit with capacity of 30,000 b/sd, photographed during course of construction.



Crude charging pumps for topping plant.



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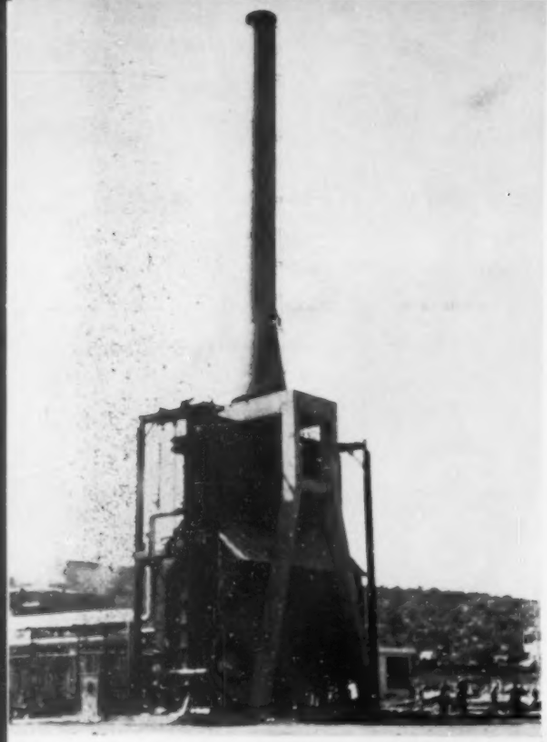
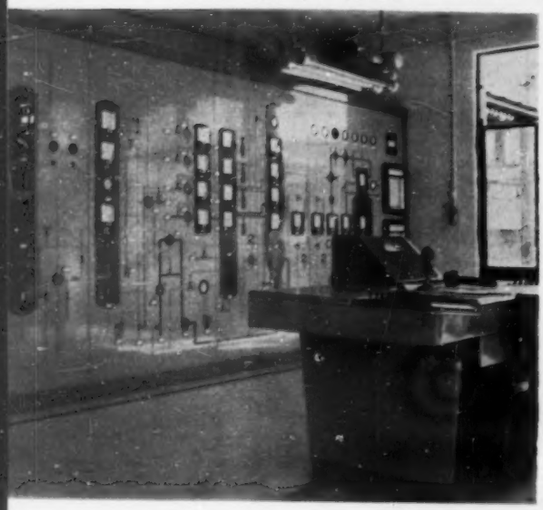
THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

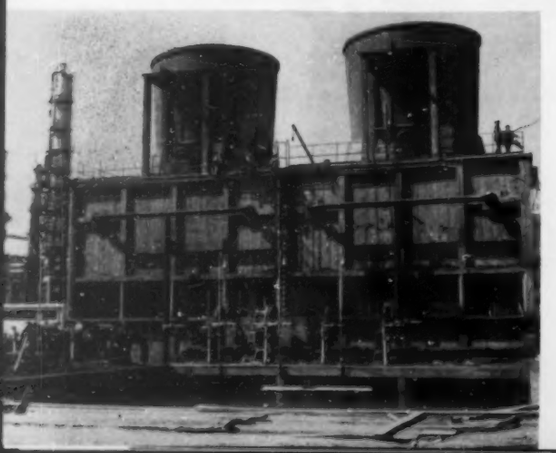


Heater for crude still at new GOLFO refinery.

Graphic panel in topping-plant control house.



Twin water towers capable of cooling 1,000 cubic meters of water per hour.



for ballast-water discharge from tankers, and one 4-in. line for fresh water. Two tanker loading-unloading points can receive crude from two 45,000 dwt tankers at a time—berthing about 750 ft offshore. To provide a depth of 36 ft at the end of offshore lines, it was necessary to dredge about 350,000 cubic meters of bottom muds. A pier has also been erected at which one 18,000 dwt tanker can berth for discharging operations, and where bunkering facilities for medium-size ships are supplied.

Gaeta Bay, shielded against the winds by hills at north and east sides, is one of the most favored spots of the Thyrrenian coast for tanker loading and unloading.

Sea-water pollution is avoided by taking out ballast water from the tankers to the refinery—thus protecting oyster beds developed in the vicinity.

Crude supply to the refinery will come mainly from the Middle East, via the East Mediterranean route. Crude supply is also coming from the recently developed Egyptian field of El Belayim on the Sinai peninsula exploited by an international concern, in which the Italian government agency ENI has a major share.

Crudes which have been processed so far at the GOLFO refinery are those from Saudi Arabia, Iraq, Wafra, Neutral Zone, and from El Belayim—whose general characteristics are reported in Table I.

The average product yield of the refinery, when completed with Unifining-Platforming unit presently under construction, will be as follows (weight basis):

	% by Weight
Regular-grade gasoline (F1 ON 98-100)	12
Premium gasoline (F1 ON 98-100)	3
Kerosine and jet fuel	3.5
Gas and diesel oils	30
Residual fuel oil	44
LPGas	1.5
Fuel gas + fuel oil for refinery use	6

The above products distribution is presently the most common in Italian refineries, and represents the closest possible approximation to the average distribution of the demand from the internal market. For this products pattern, the operating cycle generally adopted is centered on topping-hydrodesulfurization-catalytic reforming units. Catalytic cracking is now playing a minor role, especially in refineries which are not directly connected with gasoline-distribution networks. In the case of GOLFO, the adoption of a refining scheme which minimizes gasoline yields is further justified by the refinery location. Consumption of gasoline in South Italy is lower, on a per-capita basis, than the average Italian consumption.

Main plants and units of the refinery include one 30,000 b/sd topping unit—with recovery of primary gases, stabilization of straight-run gasoline; hypochlorite treating of light straight-run gasoline, and a splitter for Platformer feed-stock preparation. A combination UOP Unifining-Platforming unit of 3,000 b/sd capacity, now nearing completion, is to be provided with reformate stabilization and recovery and with purification of reforming gas—followed by a LPGas debutanizer.

The recovery and control of refinery gases is complete. About 25% of fuel consumption of the refinery is being furnished by refinery-gas streams (uncondensable gas, 1.5%; and residual fuel, 4.5% by weight).

Cooling of the refinery water is carried out in two cooling towers (built by SPIG, Milan) whose frame is of reinforced concrete. The towers are supplied with asbestos-concrete cooling elements. This feature is a rather common one in Europe, where high cost of wood material favors such a solution. The towers, each independently operating, can treat up to 1,000 cubic meters of water per hour. Fan pads of about 20-ft diameter give each an air output of 980,000 cubic meters per hour.

Liquid effluents are treated in closed-cycle, basins, and water discharged to the sea contains less than 5 ppm hydrocarbon contaminants. Decantation pools have an area of about 1,100 square meters.

General design of the refinery has been drawn by Tecnider, Milan, which carried out also the process engineering for topping, stabilizers, and Unifining-Platforming units. GOLFO staff carried out the design and engineering work of the minor units. Process and mechanical engineering for topping and straight-run naphtha stabilizer, and mechanical engineering for Unifining-Platforming and LPGas recovery units, were under UOP process design and license. END

TABLE I—SUMMARY OF ANALYSIS OF CRUDES PROCESSED AT "GOLFO" REFINERY

CRUDE	IRAQ	RAS TANURA	WAFRA	BELAYIM
Port of embarkment	Banias, Syria	Ras Tanura, Saudi Arabia	Mena Abdullah, Saudi Arabia	Wadi Feiran, Egypt
Specific gravity, at 15 C	0.8485	0.855	0.9122	0.923
ASTM Distillation (Deg C):				
Initial boiling point	24.5	24	30	30
% distilled at 50 C	3.2	2.5	0.7	0.5
" 100 C	10.8	8.7	3.6	4.2
" 150 C	21.3	18	8.3	9.3
" 200 C	32.5	27.7	14	15.7
" 250 C	42.7	37.6	21	22.7
" 300 C	53	47.6	25.6	—
RVP, kg per sq cm	0.286	0.225	0.190	0.220
Engler viscosity at 20 C	1.79	1.92	14.04	37
Sulfur, % by weight	1.96	1.73	3.30	3.14
BS&W	0.6	0.2	0.8	0.25
Ashes	0.004	0.04	0.02	0.02

Contractors to the Oil Industry

The Iraq Government Refinery at Daura, Baghdad. We supplied the majority of the tanks and erected all of them, including the lubricating oil plant tanks shown in left foreground. The total number of tanks supplied was 120 and tank steel 7847 tons.

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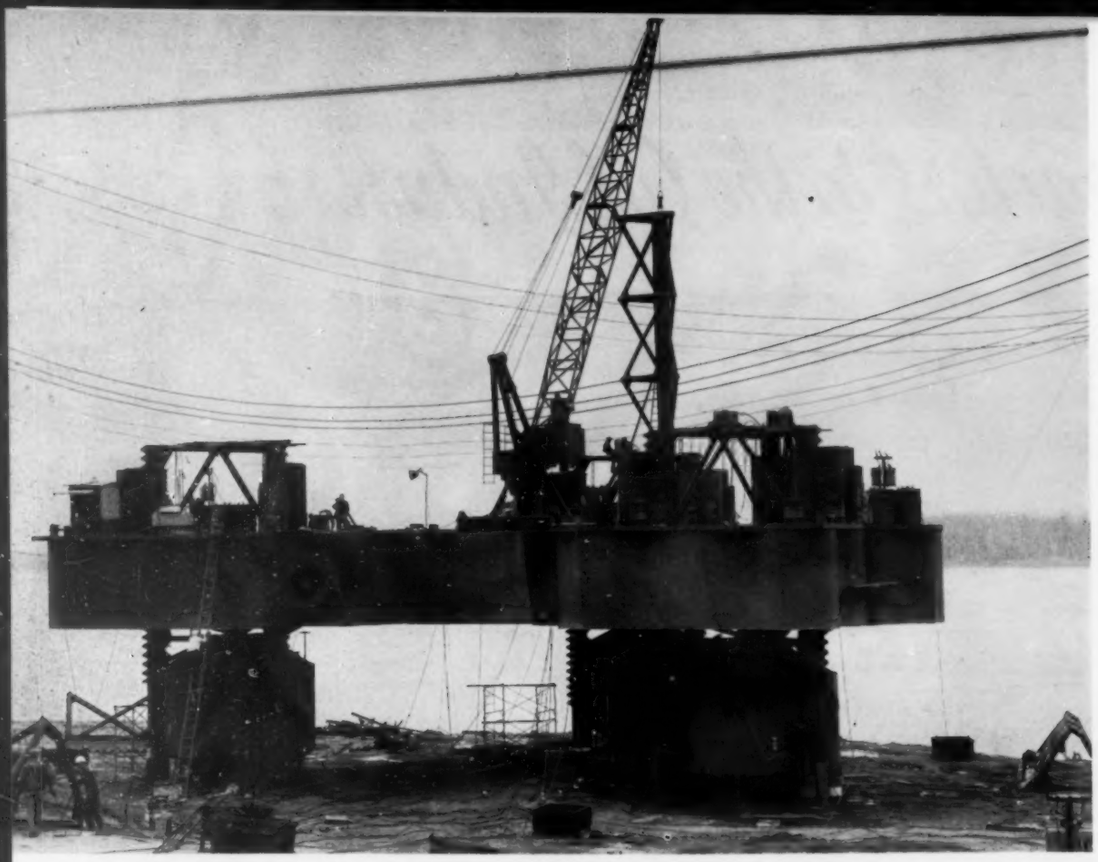
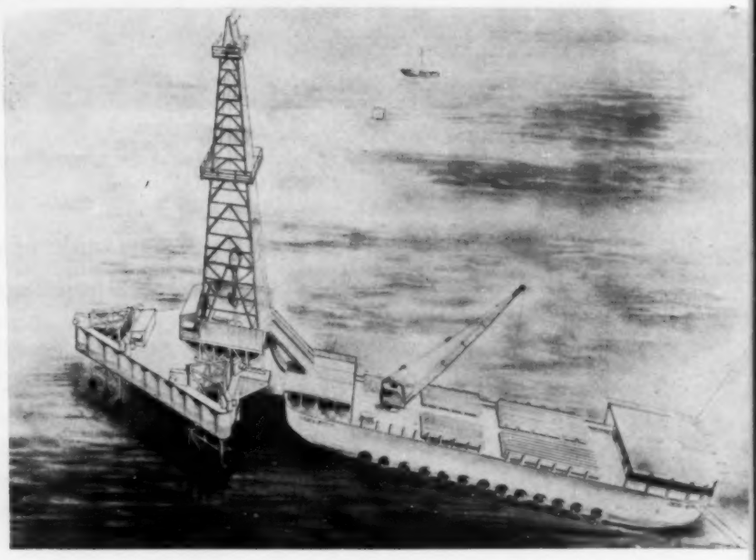


Construction progress on Aramco's new portable drilling platform under construction by R. A. LeTourneau Inc.

Below: Artist's conception of mobile tender-type platform built for Arabian American Oil Co. at cost of $750,000 by R. G. LeTourneau Inc., of Longview, Texas.



(*Continued from page 33*)

built originally for Creole Petroleum Corp., and drilled its first well on Lake Maracaibo. She is undoubtedly the world's most traveled drilling barge, having been towed from New Orleans to Venezuela before her long trip to the Middle East.

When originally built in 1948 by Avondale Marine Ways, the drilling barge now operating in the Persian Gulf was dubbed the "Queen Mary" because of her size and crew appointments, which were unique at that time. The barge measures 174 ft by 70 ft, with a draft of 12 ft, and is equipped with three 400-kw Westinghouse dc generators driven by Clark diesels for drilling power. In addition, four 75-kw auxiliary generators provide power for lighting, shaleshaker, etc. Oil-well mud pumps driven by 500-hp motors also are mounted on the barge with mud tanks.

In operation, the barge is moored to a permanent-type platform on which are mounted motors for drawworks and rotary table. Drawworks are chain-driven by an 800-hp motor momentarily capable of 1,575 hp. The rotary table is direct-connected to a 300-hp motor. Motor loads are constantly visible to the driller on a conveniently placed meter panel. In addition, klaxons are installed on main motor circuits to insure immediate attention to an overloaded motor.

The drilling barge "Adma Enterprise," to be operated by Abu Dhabi Marine Areas Ltd., is the first of its kind to be built in Europe. It was built by Gutehoffnungshütte Sterkrade AG, and designed by the DeLong Corp., of New York, in conjunction with Abu Dhabi Marine Areas Ltd. for operating in water up to 80 ft deep. It is approximately 200 ft long by 100 ft wide, and has a depth of 15 ft. It has four retractable legs, each 10 ft in diameter by 165 ft long, on which it is elevated or lowered as required by eight DeLong hydraulic jacks.

A National 130 drilling unit, complete with all the necessary drive gear, pipe racks, drill pipe, etc., capable of drilling a hole up to 15,000 ft deep, is installed on the barge. This unit is powered by four 400-hp Paxman engines. The 140-ft-high derrick is mounted on a 30-ft by 30-ft base, is capable of a maximum pull of 1,100,000 lb.

For the storage of the various chemical materials which are required in the drilling operations, three large hoppers have been installed. These hoppers are capable of handling 140 tons of cement, 125 tons of barytes, and 80 tons of bentonite. Variable-speed screw conveyors are employed to deliver the chemicals to the mixing tanks. In addition to the above, storage capacity has also been provided for: (1) 500 tons of fuel oil; (2) 170 tons of potable water; (3) 900 tons of drilling fresh water or ballast; (4) 140 tons of salt water; (5) 400 tons of mixed mud.

For cementation of the casing, etc., a

Four LeTourneau Mobile Offshore Drilling Platforms Under Construction At Vicksburg, Mississippi, Plant.

LEADING OFFSHORE DRILLERS CHOOSE LeTOURNEAU PLATFORMS

designed for different bottom conditions . . .
drilling requirements . . . operating conditions

While all of the platforms shown above offer the advantages of proved tripod design, each one has been custom engineered to meet the specialized requirements of the various drillers.

For instance, these four platforms were designed for a variety of bottom conditions ranging from the Gulf of Mexico to the Persian Gulf . . . taking into account varying drilling requirements and operating conditions.

A standard feature of every LeTourneau platform is the ease and speed at which it can be re-located, due to the unique electro-mechanical system of raising and lowering the platform on its three legs. LeTourneau platforms now in service are winning a reputation for performance matched by no other rig.

LeTourneau, with many years of experience in building heavy equipment, handles the entire production from pouring the steel to final rigging. This, plus extensive manufacturing facilities permit money-saving versatility in design throughout the platform. Our engineers will discuss your requirements in complete confidence. For additional details, write for free, fully descriptive literature.

DRILLING IN DEEP WATER

Write for free brochure showing method of drilling in water up to 600 feet deep.

M-110

R.G. LeTOURNEAU INC

Marine Products Division
2892 South MacArthur, Longview, Texas

Halliburton T-10 unit has been supplied which can mix and place cement slurry at the rate of 100 tons per hour. Besides cementation, mud and water circuits are connected with the aforementioned unit to enable direct pumping up to 10,000 psi through the drill pipe or well head, should the need arise. A Schlumberger well-logging outfit is also accommodated on the barge.

Airconditioned living and messing accommodations are provided for up to 50 people, and considerable thought has been given to making this as comfortable as possible. Three 15-ton units supplied by Rudolph Otto Meyer, of Hamburg, will supply the airconditioning and refrigeration requirements. Fresh water will be manufactured on the barge by a flash evaporator supplied by Messrs. Atlas-Werke, of Hamburg, utilizing the waste heat from the diesel engines. This unit has a capacity of approximately 770 gal per hour of fresh water with five diesel engines running at full load.

The main electricity supply is 440 volts, 3-phase, 50-cycles, and is obtained from three 220-kw alternators which are driven by Davey, Paxman Type 12 RPH engines. These three units are installed in a generator house, which also contains the switchboard from which the various supply circuits are controlled.

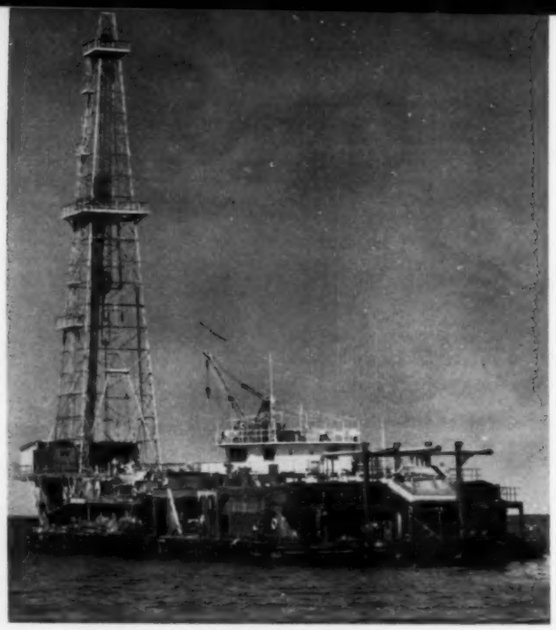
The barge is equipped with a Weserhütte W24S mobile crane capable of lifting up to 30 tons. This crane is used for landing supplies and personnel from barges which will be moored alongside. Normal servicing of the barge will be carried out by three general service launches, five 100-ton barges, together with a 600-ton landing craft and a 30-ton refrigerated barge. The barge is also equipped with lifeboats and other lifesaving facilities. It has a helicopter landing deck, and Westland Widgeon helicopters are to be used for urgent and emergency communication between the barge and the base on Das Island in the Persian Gulf. Radiotelephone equipment is installed for normal communication with the island base.

The barge was towed to the Persian Gulf through the Suez Canal. At a speed of about four knots, the tow took 2½ months. On arrival at Das Island late in December, the final work of outfitting was undertaken. When this is completed, the barge will be towed about 20 miles to the location selected for the first test.

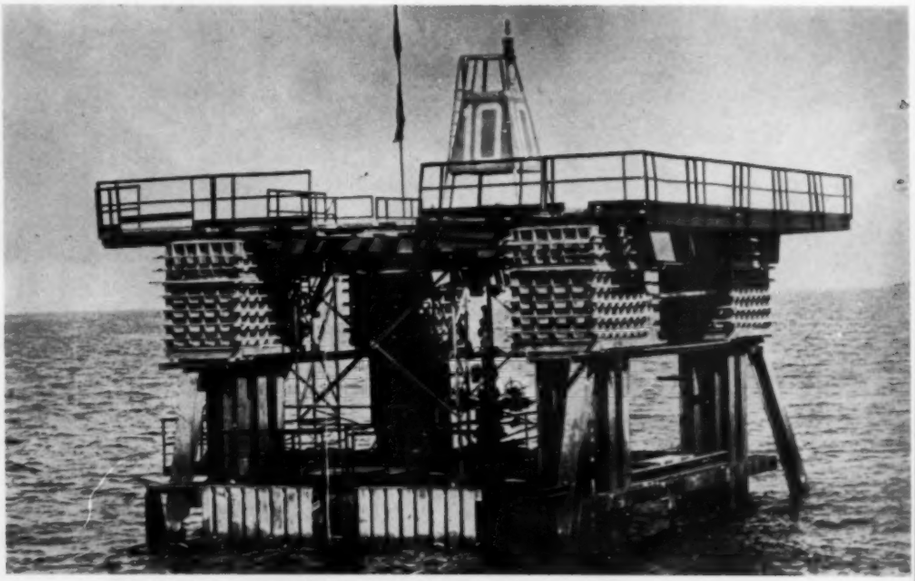
Abu Dhabi Marine Areas Ltd. is a jointly owned company organized by The British Petroleum Co. Ltd. and Compagnie Française des Pétroles. Its 12,000-square-mile concession off the Trucial Coast was granted in 1953 by the Ruler of Abu Dhabi. Since that time, an active reconnaissance program has been carried out with seismic and other geophysical methods. Onshore in this general area, a limited amount of exploration drilling has been conducted without success.

With the areas to be studied so large, and with more companies involved, it is apparent that wildcatting in the Persian Gulf will be active for some years to come.

END

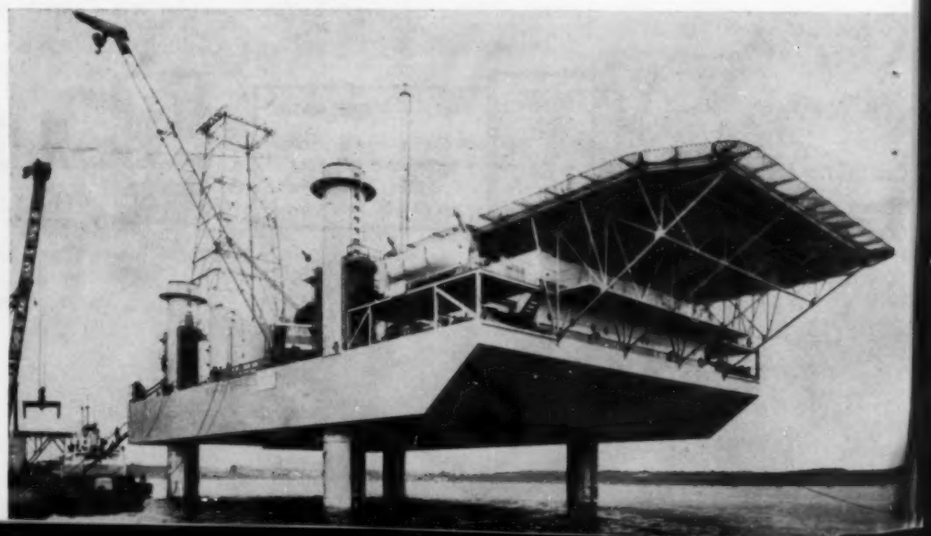


The "Queen Mary" drilling a well in the Safaniya field.



Aramco's Safaniya field in the Persian Gulf is the largest offshore oil field proved to date anywhere in the world. Like the rest of the widely spaced wells in the Safaniya field, Safaniya No. 10 (above) is topped by a blinking light. The christmas tree is almost hidden inside the well platform.

The mobile drilling barge "Adma Enterprise" which is now ready for drilling in the Persian Gulf (BP photo).



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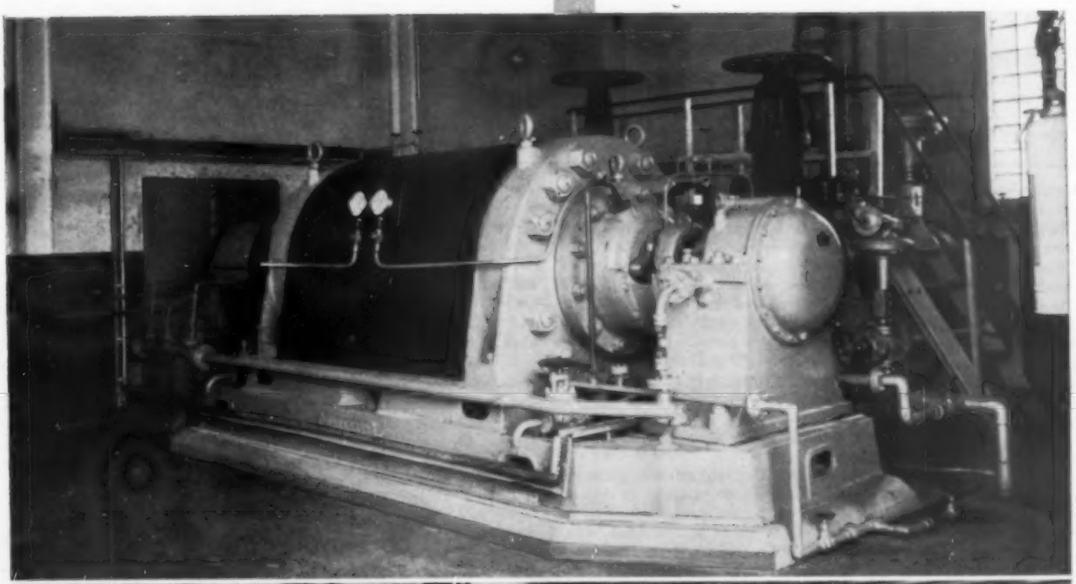
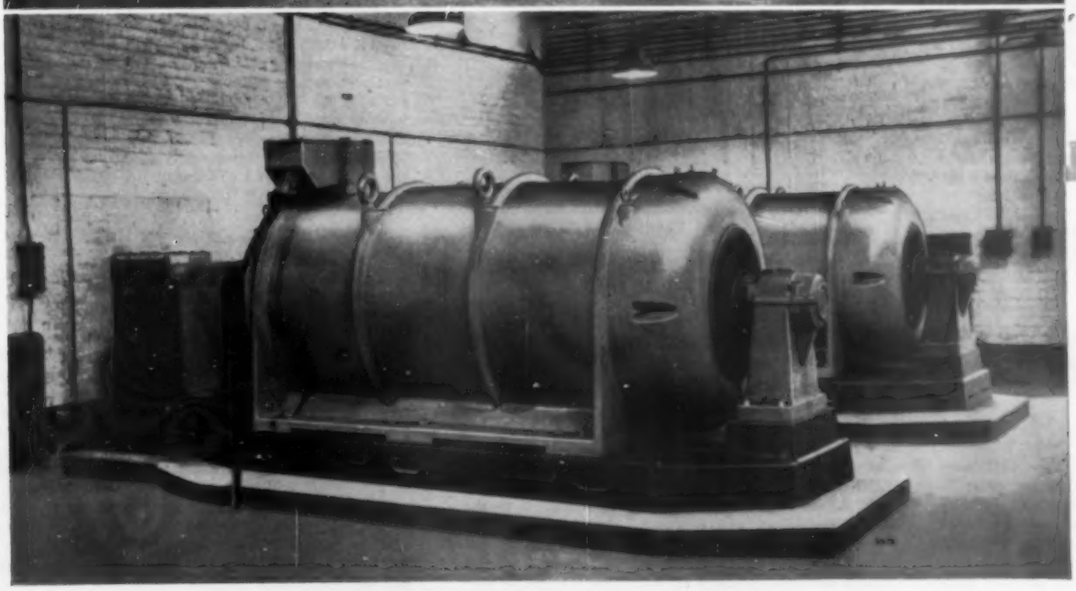


A Mather & Platt Plurovane pump rated to deliver 1760 g.p.m., of crude oil at a head of 2100 feet installed at a Scottish oil pipe-line booster station.



Two 1000 h.p. flameproof motors installed to drive Mather & Platt oil pumps in the famous Oil Pipe Line round Britain.

708

Washington Pipe Line

Continued from page 5

DISTRICT V CRUDE-OIL IMPORTS
(In Thousands of Barrels Daily)

Major Importers	1956	1957[1]	2-Year Average	Programmed 1st Half 1958	Imports per Formula
General Petroleum	32.5	27.5	30.0	27.4	25.5
Richfield	1.5	19.5	10.7	26.9	9.1
Shell Oil	28.1	48.2	38.2	35.0	32.5
Std. of Cal.	22.1	47.8	34.9	55.2	29.7
Texas Co.	21.9	26.4	24.2	28.5	20.6
Tidewater	43.1	46.0	44.6	51.0	37.9
Union Oil	11.7	17.6	14.6	14.0	12.4
Wilshire Oil	12.2	30.3	21.3	30.8	18.1
Sub-Total	173.1	263.7	218.5	268.8	185.8
Smaller Importers					
Douglass	1.0	4.5	2.8	4.7	4.7
Fletcher	—	5.1	2.5	5.7	5.5
Mohawk	0.2	—	0.1	3.8	3.1
U.S. Oil & Ref.	—	2.0	1.0	11.7	4.0
Sub-Total	1.2	11.6	6.4	25.9	17.3
New Importers					
Caminol	—	—	—	7.5	3.0
Edgington	—	—	—	3.0	3.0
Hancock	—	—	—	3.6	3.0
McMillan	—	—	—	2.5	2.5
Sunland	—	—	—	2.5	2.5
Superior	—	—	—	35.0	3.0
Sub-Total	—	—	—	54.1	17.0
GRAND TOTAL	174.3	275.3	224.9	348.8	220.1

[1] 1957 = 10 months actual and Nov.-Dec. estimates as reported to Dept. of Interior.

Eleven of the 18 companies importing crude oil to the West Coast have commented to U. S. officials on the new "voluntary" program to limit imports to the West Coast. Other companies are giving their replies. Here are the comments, as received in the office of Captain M. V. Carson, Jr., crude oil imports administrator at the Department of the Interior:

Mr. Carson announced that Tidewater, Union, Edgington, Sunland, General Petroleum, Fletcher, Shell and Douglas said they will comply. Mohawk said it will comply, but said it thought it should be allowed to bring in all it planned.

Richfield, said Mr. Carson, said it cannot understand its quota of 9,100 b/d, against programmed 26,900 b/d, and requests further information. Wilshire said president Robert O. Anderson is away until after the first of the year, so it is withholding comment. But, the company asked appointment with Mr. Carson after the first of the year on the matter.

Venezuela has issued a mild statement expressing its views on the restrictions of imports from that nation. Dr. Carlos Perez de la Cova, minister counsel for petroleum affairs at the Venezuelan Embassy, said he does not wish the statement to be considered as a protest, since Venezuela does not wish to appear as interfering in USA domestic affairs.

Dr. de la Cova reminded the USA that one of the aims of its foreign policy has been to stimulate foreign trade, and that the need for foreign oil has been an integral part of the country's foreign economic and strategic policy. Under the principle of reciprocity, trade between the two countries has been fostered by the Supplementary Trade Agreement of 1952.

Discussing hemisphere security, Dr. de la Cova said that "there is no doubt in our minds that, for the primary purpose of such security and defense, the oil resources of the Western Hemisphere should be considered as one unit; and that, as individual countries, the USA and Venezuela must complement each other."

Alaskan Wildlife Hearings

At least 25 USA oil companies have laid firm plans for oil exploration in Alaska, much of it in the Kenai Moose range, it was disclosed by the Chamber of Commerce of Anchorage at a recent Interior Department hearing. The companies may spend an estimated $100 million on exploration in the next few years, and, if oil is found, another $200 million for storage, transportation, and refining facilities, if Secretary of the Interior Seaton permits oil and gas exploration on Canada's most exciting oil area, the Kenai Moose range, where Richfield found oil last July, the chamber added.

Enthsiastic Alaskans saw a "striking" similarity between the Kenai find and the San Joaquin Valley in California, and added that the Kenai pool could hold four billion barrels of oil and be capable of producing as much as Iran, more than half a million barrels daily, ultimately.

The Interior Department hearing was held to consider objections to proposed regulations of the secretary to shut off some wildlife areas from oil and gas operations.

The Interior Department has proposed regulations which would shut some areas to oil and gas leasing in the United States proper as well as in Alaska. Wildlife refuge areas in the USA would be closed to oil operations, except to protect against drainage.

Listing oil companies which have shown interest, the chamber said Richfield Oil Corp. and Standard Oil Co. (Calif.) have announced they will spend $30 million on the Kanai peninsula in the next few years. Humble Oil and Refining Co. and Shell Oil Co., as partners, have launched a $30 million exploration project on the Alaska peninsula at Jute Bay. Phillips Petroleum Co. has spent $8 million in the vicinity of Icy Bay, and plans to continue its exploration work.

The chamber also named these companies as having purchased Alaskan land for oil exploration: Gulf Oil Corp., The Texas Co., Sunray Mid-Continent Oil Co., Union Oil Co., Ohio Oil Co., General Petroleum Co., Oceanic Oil Co., Superior Oil Co., Atlantic Oil Co., Great Basin Petroleum Co., Franco Western Oil Co., Honolulu Oil Corp., Reserve Oil & Gas Co., Husky Oil Co., Three States Natural gas Co., Skelly Oil Co., Plymouth Oil Co., Colorado Oil and Gas Ltd., Benedum-Trees Oil Co., Texota Oil Co.

Views of Tax Committee Chairman

Representative Wilbur D. Mills (D., Ark.), an outstanding tax authority who has become chairman of the powerful House Ways and Means Committee told *World Petroleum* that crude-oil imports to the USA are limited by "voluntary" action of importing companies. He does not plan to consider the depletion allowance at the general tax-revision hearings which opened, January 7.

He doesn't foresee capital-gains or high-bracket tax relief. He doesn't like a general sales tax. He doesn't like selective excise taxes, but foresees no change for revenue and political reasons.

Mr. Mills wants something done about estate taxes so a small business won't have to be sold off to pay the tax collector. He would like tax relief for small business. He'll vote to increase the national debt, if the administration makes out a good case. If defense needs are high, he'll go for an unbalanced budget. If the economy takes a "permanent" dip, he'll go for an unbalanced budget, by tax relief, to pump more life into business. But, he'd not do this for a "temporary" decline.

Mr. Mills wants tax exemptions for the self-employed so they can set up retirement funds, but fears the cost of the program at this time. And he thinks Internal Revenue Service can make its forms simpler by a few changes in the law.

Agree On Products-Line Conversion

The way now appears clear for Texas Eastern Transmission Corp. to own and operate a products pipeline from Texas to near Pittsburgh. The city of Pittsburgh and a group of barge operators, after fighting the project for years, dropped their opposition under certain conditions. Among the conditions are these:

1. Texas Eastern, which operates the wartime little and big inch lines and other facilities in natural-gas service, is not to use its gas business to subsidize the oil-products line. The oil line competes with barges hauling products on the Mississippi, Ohio, and other rivers.

2. Texas Eastern is to lay no new laterals on the oil-products line to river-port terminals without approval of the Interstate Commerce Commission, which would consider effects of the laterals on barge traffic. However, if ICC says it has no jurisdiction, this condition shall not apply.

3. Texas Eastern is to operate the oil line at fair and reasonable rates as approved by ICC, and which are based on a valuation of about $110 million.

Barge operators suggested the conditions, and Texas Eastern counsel accepted them at a public hearing, December 23, before FPC Examiner Costello.

FPC approved Texas Eastern's plan to convert the Little Inch from gas to oil products some time ago, but the courts returned the matter to FPC to consider the effect of the conversion on barge operators. Meanwhile, Texas Eastern went ahead with the conversion, and built other gas facilities, as allowed by FPC, to take care of all present gas customers.

Taylor Named To Trade Committee

Resse H. Taylor, chairman of Union Oil Co. of California, is the only oil executive named to the 60-man World Trade Advisory Committee to Secretary of Commerce Weeks. Aim of the committee is to line up business support for freer trade between the nations. Mr. Taylor was reported by Commerce Department as "in general support" of President Eisenhower's program for a five-year extension of the Reciprocal Trade Agreements program. The act lets the USA negotiate tariff cuts with other nations.

Tanker Tax Ruling

A company which charters out tankers to an oil company need not pay the 3% tax on the transportation of property under specific conditions, the Internal Revenue Service has ruled.

In case an oil company chartered tankers from Company M, and arranged that Company N would operate and manage the ships at cost plus a fixed fee, both Company M and Company N are subsidiaries of Company O. IRS has ruled that neither the chartering of the tankers nor the operation agreement "constitute transportation of property for the oil company" within the meaning of the tax laws.

Under the tax laws, the tax is due on transport of property from one point in the United States to another, whether by rail, motor, water or air. A company using its own transport facilities need not pay the tax, under the law.

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Oil Company Staff Changes

FRANK C. HENDRY, former overseas attorney of Jersey Standard, in the past associated with Esso Standard do Brasil, Rio de Janeiro, and with Creole Petroleum Corp., Caracas, and before that in private practice in Washington and Philadelphia, has been recently retained to advise the government of Saudi Arabia (in that country) on legal matters involving petroleum. He has also been named recently as arbitrator for the Saudi Arab government in an income-tax controversy, under the laws of that country, with the Arabian American Oil Co.—which will commence in the near future. He is presently residing in Jeddah, Saudi Arabia, and plans to maintain his residence overseas, and in the Middle East.

A. DUANE BUSH has been elected president of the Independent Oil Producers' Agency. He is president of Berry Holding Co., and secretary of Berry Oil Co. and Surprise Oil Co. He has been a trustee and a member of the board of the agency for many years.

F. B. NEPTUNE has been elected executive vice president and general manager, and D. A. Roach vice president of Phillips Pipe Line Co., wholly owned Phillips Petroleum Co. subsidiary. Mr. Neptune succeeds M. O. Johnson, recently named manager of Phillips Petroleum Co.'s newly formed computing department.

JAMES P. RIACH has been named manager of the economics and market research department of Esso Colombiana SA, a subsidiary of International Petroleum Co. Ltd. Mr. Riach graduated from Northwestern University with a degree in chemical engineering, and has worked for International in South America for nearly 10 years. Prior to his new appointment, Mr. Riach was economics department head for International's marketing operations in **Peru.**

FRANK X. JORDAN, former programming specialist in the Interior Department's Office of Oil and Gas, has been added to the staff of the Independent Petroleum Assn. of America, in Washington. He joined the national petroleum organization, September 1, as petroleum analyst.

Harvey Cash

HARVEY CASH, assistant to the chairman of The Texas Co., has been elected vice president in charge of foreign operations in the Eastern Hemisphere. He succeeds A. Neil Lilley, who has been elected president of McColl Frontenac Oil Co. Ltd., in Canada.

Mr. Cash first joined Texaco in 1933 in the producing department. He transferred to New York in 1953 as assistant manager of foreign operations in the Eastern Hemisphere and, a year later, was made general manager of the department.

FRED H. MOORE, coordinator of domestic production, has been appointed general manager of the producing department, Socony Mobil Oil Co. Inc. His sucessor as coordinator of domestic production is **HENRY L. WASZKOWSKI**, who has also been named a member of the producing committee. Prior to his assignment, Mr. Waszkowski was assistant to the manager of the company's producing department.

Mr. Moore was employed by Magnolia Petroleum Co., Socony Mobil's southwestern affiliate, from 1935 until April 1, 1956, when he was named executive vice president of Mobil Oil of Canada Ltd. He was recently transferred to Socony Mobil as coordinator of domestic production.

T. C. Twyman

T. C. TWYMAN has been elected senior vice president of The Texas Co. in charge of coordinating worldwide sales activities. He resigned as president of McColl Frontenac Oil Co. Ltd., Montreal, to accept the new assignment. He is succeeded at McColl Frontenac by A. Neil Lilley.

Mr. Twyman joined Texaco in 1930, and in 1942 was made vice president of McColl Frontenac in charge of sales and a director. He was made executive vice president in 1946 and president in 1952.

NORMAN HARDY, executive vice president of the Arabian American Oil Co., has been elected president, effective January 1. He succeeds R. L. Keyes, who is retiring. Mr. Hardy has also been made chief administrative officer and a director of the company.

Mr. Hardy began his oil career in 1926 as a geologist with the Standard Oil Co. of California. He has worked in Indonesia, Holland, and South America, as well as in the United States. Prior to joining Aramco in 1951, Mr. Hardy was president of the Richmond Petroleum Corp., a subsidiary of Standard Oil Co. of California. His headquarters will continue to be in Dhahran, Saudi Arabia. F. A. Davies continues as chairman of the board and chief executive officer.

J. L. SLEEPER, Jr., has been appointed staff geologist of The Texas Co.'s producing department—domestic—with headquarters in New York. He had been assistant division geologist, West Texas Division, at Fort Worth, Texas.

ROBERT H. BROOKS has been promoted to geophysical representative for Mobil Exploration Nigeria Inc., a Mobil Oil of Canada affiliate, headquartered in Lagos, Nigeria. A native of London, Cntario, Mr. Brooks joined Mobil Oil of Canada in 1950, became a district geophysicist in 1953, and at the time of his transfer was staff geophysicist in Mobil Oil's Calgary headquarters. Other Canadians represent Mobil Oil of Canada in Turkey, France, Venezuela, the U.S.A., Libya, and Portugal.

J. D. Fosque

J. D. FOSQUE has been elected a vice president of California Texas Oil Co. Ltd. He was formerly managing director of Caltex (India) Ltd., and in 1954 he returned to New York as European general manager. In his new capacity, Mr. Fosque will direct Caltex marketing and refining service activities in Europe and Africa.

JAMES B. TAYLOR, Jr., has been elected a member of the board of Signal Oil and Gas Co. Mr. Taylor, who has been with Signal since 1926, is also assistant manager of the company's gas department.

DAVID H. MORTLOCK has been appointed economics advisor to the executive representative's office of International Petroleum Co., Ltd., at Bogota, Colombia. Mr. Mortlock received a bachelor's degree in chemical engineering from Pratt Institute in 1939. He worked previously with the Lago Oil Co. and the Arabian American Oil Co., where he held the position of assistant manager of the manufacturing and oil supply department until his transfer to International.

D. K. LAIDLAW, assistant manager of the marine department of Shell Oil Co., has been named manager of that department, effective January 1, 1958. He succeeds W. B. Case, who is retiring after 35 years' service with Shell.

Mr. Laidlaw joined Shell in November 1945, as assistant to the vice president—marine department; head office, New York.

George W. Goad

GEORGE W. GOAD has been named manager of Tidewater Oil Co.'s oil purchase and exchange department, with headquarters in San Francisco. He succeeds John W. Gendron, whose promotion to the new post of administrative assistant to the president has just been announced. Prior to receiving his new assignment, Mr. Goad was manager of Tidewater's crude-oil department in the Southeast.

EAST COAST ETHYLENE

ESSO STANDARD OIL COMPANY's new Ethylene Plant at Bayway, New Jersey is the first to be located on the East Coast. The ethylene product is distributed through Esso's pipeline system to petrochemical plants in this strategic marketing area.

The plant produces its own steam from transfer line heat exchangers and waste heat boilers, and pipes surplus steam to the Esso refinery steam system.

Refinery gas forms the feedstock for this large capacity, high purity ethylene plant.

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International News and Notes

Tapline Royalties

Tapline last year offered half of the transit through the line, as compared with the cost of bringing Saudi Arabian crude through the Suez Canal. (During the first eight months of 1957, Tapline delivered 81,872,699 bbl of crude.) At the same time, Tapline left the matter of division of these profits to be negotiated between Saudi Arabia, Lebanon, Jordan, and Syria. Discussions have been taking place between these countries as to the division of these profits. The length of pipeline passing through each of these countries varies considerably; therefore, the countries with the shorter length of pipeline want the split-up to be based on tonnage, and thus prefer the ton-mile basis. The results of these discussions will be of interest to the Iraq Petroleum Co., whose problem is a similar one.

Czechoslovakia Producing Jet Fuel

The chemical department for synthetic fuel of the Stalin Works in Zaluzi, Northern Bohemia, has taken up the production of fuel for jet planes of the Soviet TU-104 type which Czechoslovakia will put into operation on her foreign lines this autumn.

UN Coastal Conference

International aspects of offshore pipeline will be up for study in February as a United Nations conference on the law of the sea opens at Geneva. Aim of the conference is to define the extent of the rights of coastal nations to the shores and the lands and minerals beneath them.

Basic document of the conference is a 1956 paper of a law commission under the UN which says at one point that no nation shall forbid the laying of submarine cables to its shore. At one time, this section laid out the same condition for oil and gas pipelines, but this was taken out partly because it was not seen as needed at this time.

Netherlands West Indies Tax Reduction

New law will grant patent and royalty holding companies nine-tenths reduction in profits taxes, same as for security and investment holding companies. This makes tax on profits earned overseas 2.4% on first 100,000 florins and 3% thereafter. Personal income-tax deduction on local-corporation dividends also will be granted if profits tax already has been paid on dividends.

Iran Exports in September

Consortium oil companies exported 12,055,872 bbl of crude in Sept. '57, and delivered another 355,271 bbl to NICC for export; 9,079,401 bbl were delivered to Abadan refinery. Three-item total is 21,490,544 bbl for Sept., compared with 181,426,814 bbl for 1st 9 months '57.

Ireland to Have Refinery

Irish Refining Co. Ltd. (40% each Esso and Shell Mex-BP; 20% Caltex) has begun construction of $27.5 million oil refinery at Whitegate, Cork harbor, Ireland. Lummus is main contractor for refinery—with Tank Erectors Ltd., London, for storage tanks; George Wimpey, London, for $1,850,000 marine facilities.

Algerian Stepout Well

Well OM 7, about 4.2 miles east of OM 1, came in at about the same production rate as OM 1, the discovery well for Hassi Messaoud from between 3,357 and 3,400 meters.

New Nigerian Company

New company, Mobil Exploration Nigeria Inc., has been formed for search in northern and western Nigeria.

Romania Oil Equipment, Thermal Drilling Record

Romania's Deputy Minister of Trade has declared that his country can offer for export 40% of the total output of drilling equipment for depths of 10,500 ft. 30% of the triplex pumps, and 80% of the rotary tables. At well Leordeni No. 510, drilled with plain bits furnished with thermal jets, a Romanian drilling speed record was allegedly established by achieving a mechanical speed of 20.8 ft per hour, and an operating speed of 6,611 ft per rig, per month.

Poland First Furfural Plant

Poland's first furfural extraction plant, with a monthly output of 1,500 tons of engine oil, went onstream at the Jedlicze refinery in the Carpathian foothills. With the exception of the pumps, control and measuring instruments supplied by East Germany, this plant was entirely designed and constructed by Poles.

Due to the growing consumption of petroleum products, which is estimated to reach 3 million tons in 1960, the construction of six refineries is being considered. Realization of this project is also supposed to help reduce imports of products while increasing the import of crude. This year, 1.3 million tons of products and 600,000 tons of crude are to be imported. Poland produced in 1956: 183,700 tons of crude (3,674 b/d) and processed 273,283 tons (14,466 b/d).

Japanese Gas Plant

A synthetic gas plant at Kowasaki, Japan, is being built by Showa Denko K K, Tokyo. It will have a capacity of 110 metric tons (121 short tons) per day of hydrogen-nitrogen syn gas for ammonia synthesis. The plant will comprise an oxygen compression section, 2 Texaco generators, shift conversion, and CO_2 removal. Foster Wheeler will provide process design.

Third Billion Barrel in Arabia

The Arabian American Oil Co. produced its three billionth barrel of oil Wednesday, December 4. Saudi Arabia is the second nation in the Middle East and the fifth in the world to achieve this record. Only Iran, the United States, Venezuela, and the USSR have exceeded it.

Since Aramco first discovered oil in commercial quantities in March 1938, the Abqualq field has accounted for the largest share (44%) of the company's cumulative production. The 140-mile-long Ghawar field has been the second largest producer (40%), and the remainder has been produced in the Dammam, Qatif, and Safaniya fields.

Bahrain Sought by Iran

Shah of Iran has asked for parliament bill to make Bahrain Island (British-protected state in Persian Gulf) a province of Iran. British government spokesman, however, says Britain will continue its obligation to safeguard independence of the island.

Central France Search Begins

FRANCE—Ste. Anonym des Petroles du Centre-Ouest will begin search on 772-square-mile permit obtained in 1956. Joint venture of a French firm and two Americans will require minimum investment of $500,000. A. A. Seeligson, Jr., of San Antonio, Texas, and J. H. Heatman, of Wichita, Kans., will hold 49% through Molasse Erdoel Foerderungs AG (MOFAG), which they formed in Switzerland.

Amoseas 2nd Well in Turkey

American Overseas Petroleum Ltd. has spudded second Turkish well, Kahta No. 1, on Kahta Cayi structure, 17 miles SE of the capital, Adiyaman, and 70 miles NE of first Amoseas well, Aril No. 1—abandoned at 10,153 ft.

Deep Lybia Test

Oasis Oil Co. of Libya, which has let contract to International Drilling Co.NV, will drill deep exploratory test for Conorada group on 1,270,000-acre concession 75 miles south of Gulf of Sirte. International was to ship rig from Houston. Well may go to 15,000 ft.

Daura Refinery Expanded

The Government Oil Refineries Administration, Iraq, has authorized Foster Wheeler Ltd. to design and construct process facilities at the Daura, Bagdad, refinery for: (1) expansion and modification of existing combination unit, which will increase its capacity to 48,000 b/d from 24,000 b/d; (2) a 5,000 b/d Powerforming unit; (3) a kerosine treating unit—5,000 b/d; (4) substantial offsite facilities. Foster Wheeler recently completed for the Iraq government a complete lubricating-oil manufacturing plant.

Japan's Offshore Possibilities

Japanese engineers have been sent to the USA to learn modern techniques of offshore oil drilling. Seismic research recently completed by Japan Petroleum Resources Development Corp. indicates oil possibilities in five locations off the coast of northern Honshu island on the Sea of Japan.

West Bengal Well Abandoned

A new wildcat, Galsi No. 1, 21 miles northwest of Burdwan No. 1, has been spudded by Standard-Vacuum which holds 75% and the Indian government 25% of the Indo-Stanvac project. Stanvac is the operating partner in the 10,000-square-mile concession in West Bengal. Burdwan No. 1 was abandoned, without indications of oil or gas, at 8,921 ft. The well reached its bottom-hole depth after drilling into igneous rock which was encountered at 8,350 ft. It was spudded in on April 18.

Caltex's New Indian Refinery Onstream

The new 13,500 b/d refinery of Caltex Oil Refining (India) Ltd. is now onstream, it has been announced by California Texas Oil Co. Ltd. The $29 million plant is on a 515-acre site in the port city of Visakhapatnam, located on India's east coast on the Bay of Bengal. Principal products are gasoline, kerosine, diesel and fuel oils distributed throughout the Visakhapatnam and Calcutta supply areas. Crude oil comes from Sumatra and the Persian Gulf.

Wales to Have New BP Terminal

Preliminary work has begun on British Petroleum's new tanker terminal at Milford Haven, Wales. Shore arm of concrete-decked jetty will be 1,350 ft long; sea arm at right angles will be 2,300 ft long—giving accommodation for two supertankers at same time. Water depth at low tide will be 55 ft. Crude storage will be eight tanks each of 20,000 tons capacity. In addition, five tanks for bunkers and fresh-water storage are to be built. A 60-mile pipeline is being built at BP's Llandarcy refinery.

Syrian Well by Germans

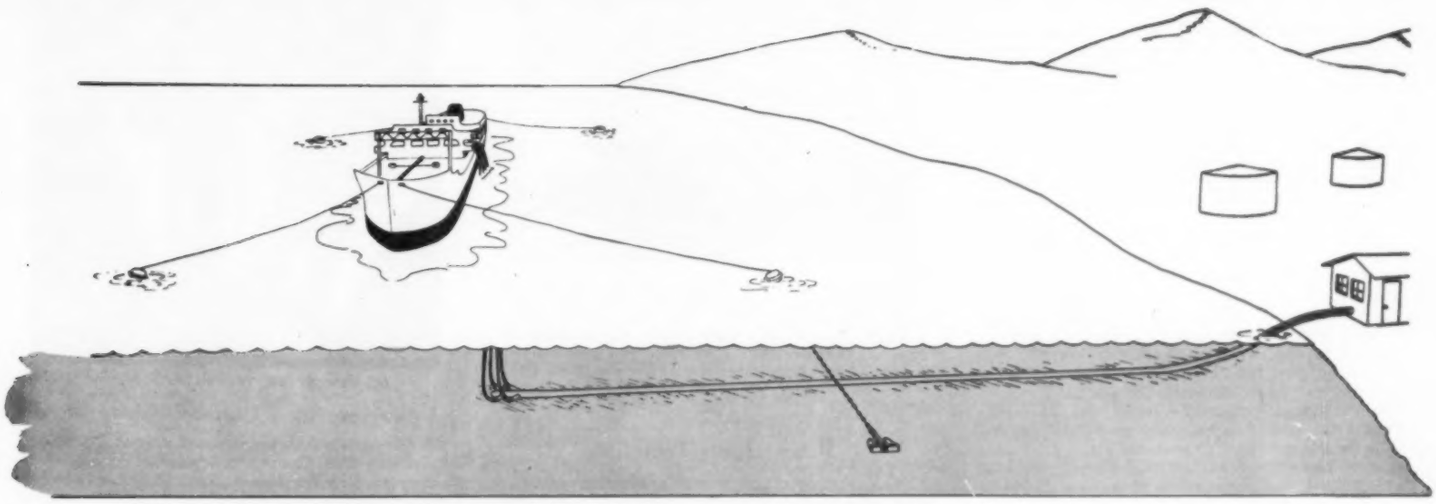
SYRIA—Deutsche Erdoel AG is below 4,672 ft at its first Syrian test site, in the Ghouna area of Jezira province, which adjoins Turkey. The 132-ft derrick will take the well to 9 800 ft. A second (4,000-ft) well is planned for early 1958.

Conorada in Lybia

Conorada Petroleum Corp. was to begin drilling in Libya during December 1957, and will undertake four drilling operations in Egypt.

USSR Pipeline

USSR—A 100-km pipeline, biggest in the eastern part of the Soviet Union, will be built in Uzbekistan. It will pass through Jarkak, Bukhara, Samarkand, and Tashkent to deliver natural gas from Jarkak area south of Bukhara. First section is scheduled for 1959 operation.



Diagrammed above is a sea-loading system designed by the Collins Construction Co. All pipeline construction required for this system can be completed in less than six months under normal conditions.

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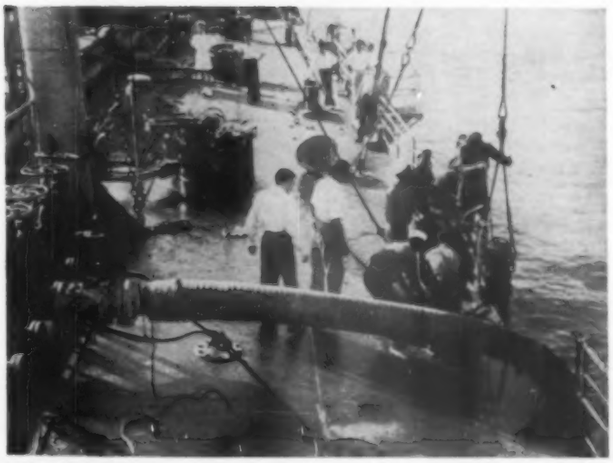

One hose already connected, another sea-loading hose is being brought on deck as the "Tagelus" of London, a T2 type 38,000 dwt tanker, prepares to begin pumping operations through a sea-loading line installed by Collins in the Bay of Bombay for the Bombay Port Trust.

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Dresser, Gardner-Denver Merger Off

Merger negotiations between Dresser Industries Inc. and Gardner-Denver Co. have been terminated. H. N. Mallon, chairman of Dresser, stated, "Dresser's very substantial growth over the years has been due in large part to an operating philosophy that stresses decentralized management. This philosophy of placing major responsibility and strong incentives at the operating company level is so integral a part of Dresser's operations that it would be detrimental to future progress if a major change were made.

"On the other hand, Gardner-Denver believes in centralizing authority and operating control in a large headquarters organization. Other areas of disagreement appeared in Dresser's objective of management-in-depth and Dresser's willingness to look at other companies in related fields that might add strength to the overall picture. Gardner-Denver's top management thought otherwise. Apparently the agreement on the fundamental benefits to be derived from the merger began to weaken and differences arose when overall management considerations entered the discussions. Unfortunately, it was not possible to reconcile these differences in concept of management, and negotiations have been ended on a completely friendly basis."

"Termination of merger negotiations with Gardner-Denver do not, of course, in any way affect the strong growth prospects of the present Dresser companies and Dresser's intention to diversify into other fields, including mining and construction, where products of the Dresser companies have a large potential." The previously announced intention to increase the dividend rate from $1.80 to $2.00 is a step that Dresser had planned to take in any event."

Tidewater To Enter Sahara

Reports from Paris state Tidewater Oil Co. may bid for Saharan acreage. It will be under a joint venture arrangement, partner unknown as yet.

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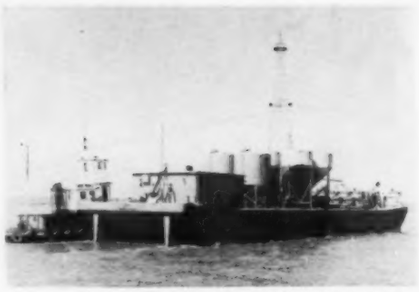


Shake-down cruise of "Halliburton 808," world's first fracturing barge, is conducted in Louisiana waters. Built at New Orleans, the "808" is now being towed to Venezuela for use at Lake Maracaibo locations. Ralph R. Emery, Halliburton Oil Well Co.'s vice president for foreign operations, said the barge's first fracturing treatment on a water location at Maracaibo was to be around January 1.

Moore Joins Tretolite

Warren E. Moore, formerly production engineer with Haynesville Operators Committee, has joined Tretolite Co. as corrosion engineer. He is located at Bossier City, La., and will cover the East Texas and North Louisiana area. He succeeds James W. Hakeman, who has transferred to Edmonton, Alta., Canada.

Thin Film Processing

Rodney Hunt Machine Co., Orange, Mass., has published a new catalog describing its Turba-Film Mark II processor and discussing the basic principles and techniques of thin film processing.

Canadian Gas Exports Delayed

Gas exports from western Canada to USA's Pacific Northwest must await decision of royal commission which now has under review Canada's overall energy situation. Inquiry affects especially 3,100-mile line of Trans-Canada Pipe Lines Ltd. as to price and fair return to producers. Others involved are Alberta & Southern Gas Co. (Pacific Gas & Electric subsidiary, San Francisco) which has plans for export of 450 mmcf per day to California, and Westcoast Transmission Co. with rival plan for same market.

Milwhite Promotes Connor

George Connor has been named vice president and operations manager of the Milwhite Mud Sales Co. He will supervise Milwhite operations in the Gulf Coast, Midcontinent and Rocky Mountain regions, and Canada.

Mr. Connor joined Milwhite in 1954 as sales manager, after having been with Garrett Oil Tools Inc. In 1956 he was promoted to vice president in charge of sales at the company's general offices in Houston. During World War II he served four years as a marine pilot.

World Geophysical Activity A Record

Final returns for 1956 chalk up another record for worldwide geophysical activity. An average 1,136 crews of all types was employed during the year, compared with 1,119 in 1955. Geophysical activity declined in the Western Hemisphere, but increased in the Eastern. Seismic exploration increased 0.6% in 1956; gravity 8.4%; magnetic declined 8.2%. Other methods—mainly electrical—declined 12%, but these account for a slight portion of the total. In USA, declines took place in all geophysical classifications.

GEORGE M. BRADY has been named manager of purchases for the American Oil Co. and its subsidiaries. Mr. Brady, who has been with American Oil since 1936, moves up from the position of assistant manager of purchases. He succeeds John A. Whitely, who retired October 6, after 52 years in the petroleum business, 38 of which were spent with American Oil and its predecessors.

Dr. Jose A. Mora and L. A. Astley-Bell

Inter-American Understanding Cited

L. A. Astley-Bell, president of Asiatic Petroleum Corp., and Shell Caribbean Petroleum Co. are being commended by Dr. Jose A. Mora, secretary general of the Organization of Armerican States. Mr. Astley-Bell received the Columbus Day citation for his efforts to strengthen the ties between the Americas through the medium of education. Asiatic Petroleum is presently supervising the welfare of 75 Venezuelan students attending USA colleges on scholarships granted by the Shell Co. of Venezuela. These scholarships cover fours years' living expenses and tuition. Shell also contributes to the Inter-American Law Inst. which annually provides the opportunity for promising Latin American lawyers to take a one-year graduate course in American law at New York University.

• • •

New Kellogg Vice President

The M. W. Kellogg Co., subsidiary of Pullman Inc., has elected Dr. Alex G. Oblad a vice president in charge of research and development activities. Prior to joining M. W. Kellogg, he was vice president in charge of research and development and on the board of Houdry Process Corp., Philadelphia. His responsibilities at the same time joined him with the expansion of the Catalytic Construction Co., a Houdry subsidiary. Earlier in his career, Dr. Oblad was associated with the Texas Research Foundation, the Magnolia Petroleum Co., and The Standard Oil Co. (Indiana).

• • •

Rockwell Acquires German Firm

Rockwell Manufacturing Co. has acquired ILO-Werke GmbH, a West German manufacturer of two-cycle air-cooled diesel and gasoline engines, according to president Willard F. Rockwell, Jr. It is Rockwell's first wholly owned manufacturing subsidiary in Europe, and represents an initial investment of more than $2 million.

• • •

Fluor In London

The Fluor Corp., Ltd., Los Angeles engineering construction firm, has established a wholly-owned subsidiary in London, England, to take advantage of the rapid expansion of the petroleum and petrochemical industries in the sterling areas and free Europe. James Tathwell, formerly manager of projects at Fluor, will head up the new firm, to be called The Fluor Engineering and Construction Co. Ltd. Thomas Harper, formerly sales engineer in Fluor's New York office, will serve as sales manager for the new organization.

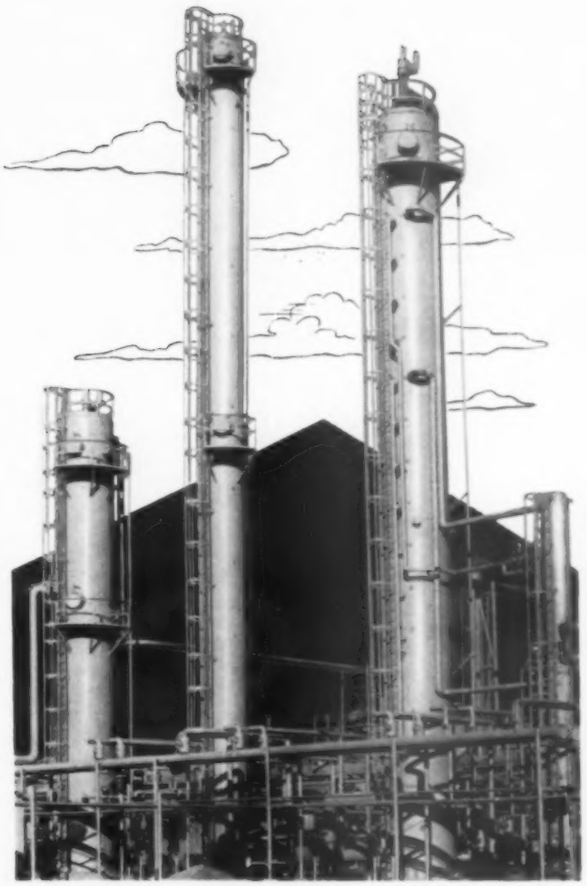
• • •

Milwhite Buys Oklahoma Firm

The Milwhite Mud Sales Co. has added Oklahoma and Kansas to its distribution area through purchase of National Services Inc., Oklahoma City. Milwhite is a division of the Mississippi River Fuel Co.

National Services Inc. will become an integral part of Milwhite's national sales organization. A complete line of Milwhite drilling-mud material and chemicals will be distributed by the newly acquired company in Oklahoma, Kansas, West Texas, and New Mexico. Milwhite's distribution area now includes 10 states and two Canadian provinces.

fingers in the sky point to Dallas Quality



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Albert L. Nickerson

Fred W. Bartlett

JENNINGS RETIRES FROM SOCONY AFTER 37 YEARS

B. BREWSTER JENNINGS, chairman of Socony Mobil Oil Co., Inc. and chief executive officer of the company, retired Feb. 1. Albert L. Nickerson, president of Socony Mobil since July, 1955, has succeeded him as chief executive officer of the company.

Fred W. Bartlett will succeed Mr. Jennings as chairman. He has been a director since 1953 and vice president for producing since May, 1957.

Mr. Nickerson, who becomes the top officer of Socony Mobil at the age of 46, joined Socony Mobil shortly after graduation from Harvard in 1933 and spent his first three years with the company as a service station attendant and manager. He became a general salesman in 1936 and was selected for management training under a program the company began that year. In 1945, he went to London with Vacuum Oil Co., Ltd., and in 1946 was named chairman of that Socony affiliate. Later that year he returned to the United States to become a member of the Socony Mobil board of directors and executive in charge of domestic marketing. He held this post for five years after which he took charge of the company's foreign marketing and refining as a vice president.

Mr. Bartlett joined Socony Mobil in 1939 after 17 years of oil experience in the United States and Mexico. Early in his career with the company, Mr. Bartlett was sent to Venezuela, where Socony Mobil then had no production. As chief geologist in Venezuela, he accelerated the exploration campaign in eastern Venezuela and pioneered exploratory work in western Venezuela. Major discoveries were made in both areas; Socony Mobil's production in Venezuela is now about 125,000 barrels per day.

In 1943 Mr. Bartlett came to New York as assistant chief geologist and in 1950 he was named manager of the producing department.

Mr. Jennings, after graduating from Yale in 1920, went to work in the marine department of the old Standard Oil Co. of New York (Socony). He became purchasing agent in 1927, manager of the real estate department in 1929, assistant to the president in 1935, and a director in 1939. He was elected president of Socony Mobil in 1944 and chairman in 1955.

During World War I, Mr. Jennings had served as an ensign on a submarine chaser. During World War II, while on leave of absence from Socony-Vacuum, he was in charge of tanker operations in the War Shipping Administration. For his contributions to the war effort he received the Secretary of the Navy's Distinguished Public Service Award.

Baker Consolidated with Englehard Industries

Formation of Englehard Industries, Inc., a new corporation with annual sales in excess of $200-million—the world's largest fabricator of precious metals and one of the 200 largest industrial companies in the United States has been announced by Charles W. Engelhard, New Jersey industrialist. The new company was formed by a consolidation of nine American companies in the precious metals and precision-manufacturing fields, some of them over 50 years old. Three other domestic companies and twelve foreign corporations also are controlled by the same interests, it was disclosed.

Largest of the firms consolidated into Engelhard Industries, Inc., is Baker & Co., Inc., which grossed some $53-million last year. Its main business has been the refining and fabrication of platinum. Baker is a manufacturer of platinum bearing catalysts for oil refiners and has prepared specialized catalysts containing such metals as Phodium and Palladium.

NIKITA HARWICH of Caracas, Venezuela has been elected to the board of San Jacinto Petroleum Corp., and to the board and executive committee of San Jacinto Venezolano, C. A., the company's wholly-owned subsidiary operating in Venezuela. The announcement of Mr. Harwich's election was made today in Caracas by Mr. Benno C. Schmidt, chairman of both companies, who is presently in Venezuela in connection with company affairs. Mr. Harwich is a citizen of Venezuela, is president of Servicios Hydrocarb, C. A., and is active in a number of other Venezuelan business enterprises.

W. F. SCHOENTHALER, distribution manager for Shell Chemical Corp., has been named manager—transportation, in Shell Oil Co.'s transportation and supplies organization. He replaces K. W. Martin, who has been transferred to the New Orleans exploration and production area. H. W. Dent, products manager in the transportation and supplies department replaces Mr. Schoenthaler as distribution manager for Shell Chemical. R. H. Tubman, assistant manager of manufacturing operations, has been named products manager, replacing Mr. Dent.

B. E. TAYLOR has been elected a vice president and company treasurer of Mobil Oil of Canada, Ltd. JOSEPH SPIVAK has been promoted to exploration manager and elected a director. The effective date for the changes will be December 1.

RALPH D. WATERMAN has resigned from the board of E. B. Badger & Sons Ltd., London, and has retired.

Builds German Plant

Christensen Diamond Products is building a plant at Celle, West Germany, about 26 miles from Hanover, to produce drilling bits. It will be the fourth foreign-bit manufacturing plant established by Christensen since 1953. The other affiliated plants are located at Paris, Tokyo, and North Bay, Ontario.

FIFTH WORLD PETROLEUM CONGRESS

THE Board of the Fifth World Petroleum Congress Inc. has been announced from congress headquarters at 527 Madison Avenue, New York 22, N. Y. Its members are: Reid Brazell, president and general manager of Leonard Refineries Inc.; F. S. Clulow, recently retired vice president of Shell Oil Co.; Ira H. Cram, a director and senior vice president of Continental Oil Co.; G. A. Davidson, vice president and director of Standard Oil Co. of California; C. Eugene Davis, general secretary of the congress, formerly vice president of Shell Oil Co.; Dr. H. W. Field, vice president and general manager, research and development department, The Atlantic Refining Co.; W. C. Kinsolving, president of Sun Pipe Line Co. and Sun-Canadian Pipe Line Co.; Dr. W. E. Kuhn, general manager of the research and technical department of The Texas Co.; John W. Mecom, Houston; Dr. Jerry McAfee, vice president of Gulf Oil Corp.; E. B. McConnell, director and vice president of The Standard Oil Co. (Ohio); Dr. E. V. Murphree, president of Esso Research and Engineering Co. and president of the Fifth World Petroleum Congress Inc.; H. B. Nichols, senior vice president of the California Texas Oil Co. Ltd.; Carl E. Reistle, Jr., director and executive vice president of Humble Oil and Refining Co.; J. K. Roberts, director and vice president, Standard Oil Co. (Indiana); and Dr. J. C. Zimmer, technical advisor, research department, Socony Mobil Oil Co. Inc.

Papers which will be presented at the congress have been divided into nine sections; and a program coordination committee, consisting of nine directors under the chairmanship of Mr. Roberts, has been appointed to select papers for presentation. Each of the directors has been assigned a section, and the directors and the sections for which they are responsible are: Mr. Cram, geology and geophysics; Mr. Reistle, drilling and production; Mr. Field, oil processes and refining; Mr. McAfee, chemicals from petroleum and natural gas; Dr. Kuhn, composition, analysis and testing; Dr. Zimmer, utilization of oil products; Mr. Nichols, engineering, equipment and materials; Mr. Kinsolving, transportation and distribution; and Mr. Roberts, operations research, statistics and education. END

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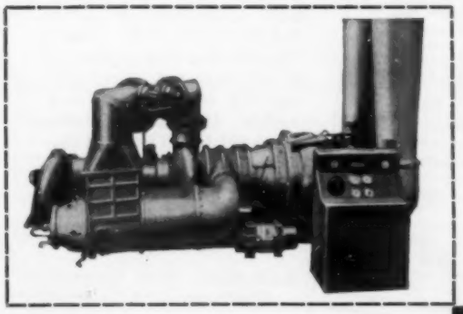

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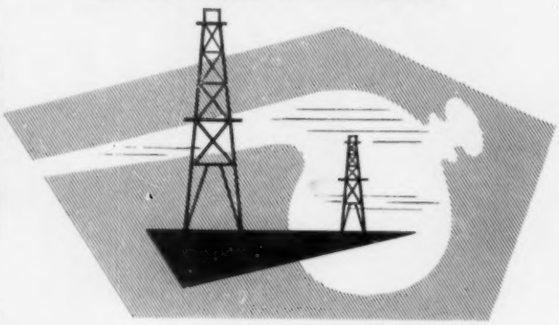

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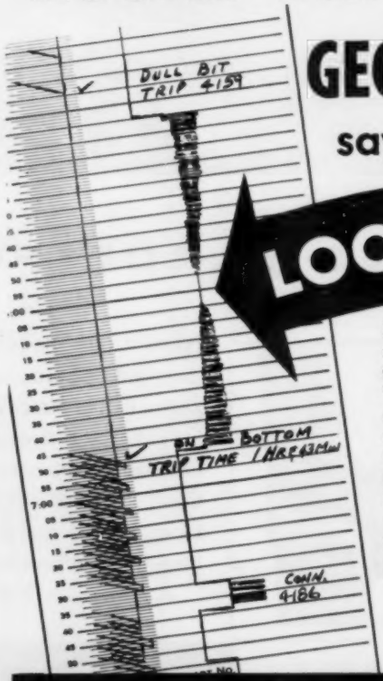

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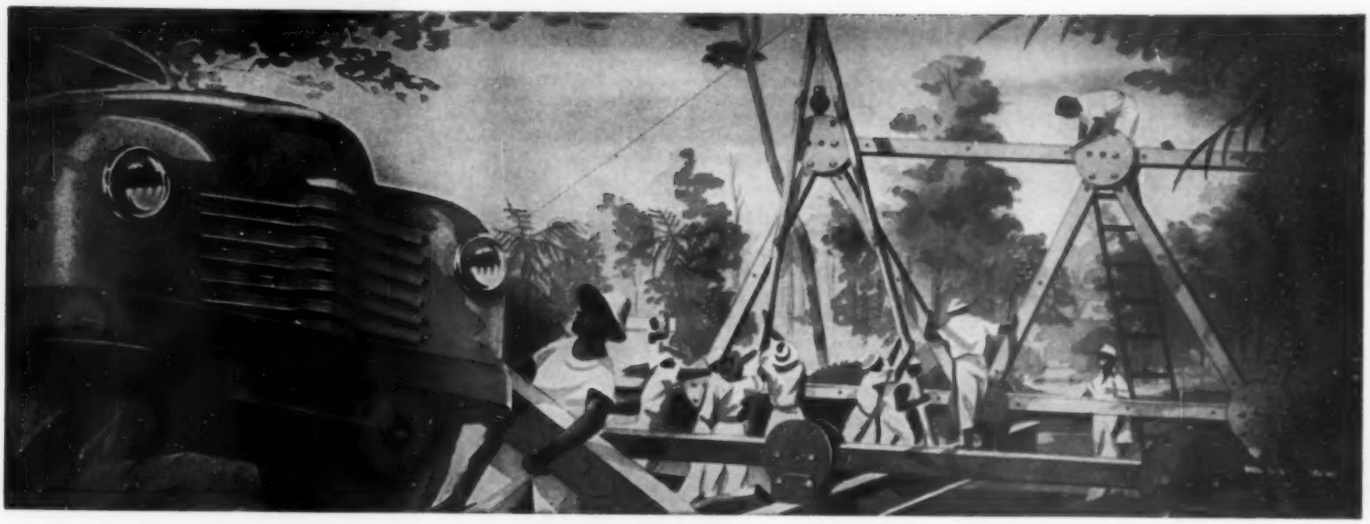

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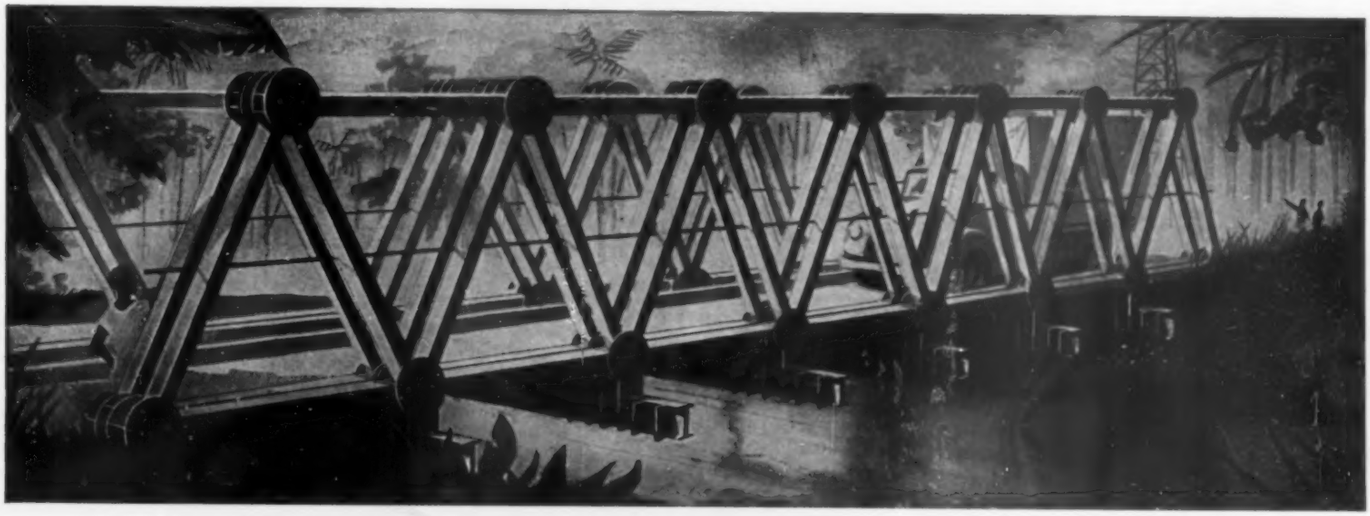

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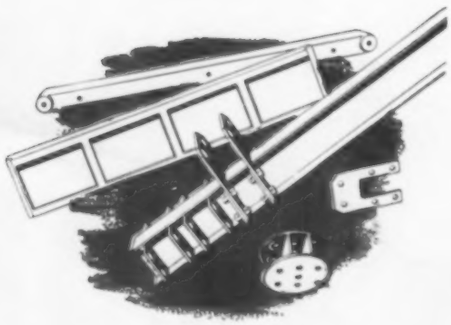

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Robert A. Bever

New LeTourneau Export Representative

Robert A. Bever has been appointed export sales representative for R. G. LeTourneau Inc. Export sales manager F. G. Evangelist said Mr. Bever's appointment was in view of LeTourneau's expanding foreign activity in the heavy equipment field.

Mr. Bever spent eight years in the Middle East as Caterpillar district representative. The period immediately prior to joining LeTourneau was spent in the Scandinavian and other European countries, Belgian Congo, and South Africa—conducting a survey of the sales potential in those areas.

Erratum

The map of the Amazon basin, page 45 of the October issue, indicates four proposed wells near the village of Contamana. Only three are proposed at this time, at the nearby Maquia discovery. The four symbols are in error, and only indicate the village location.

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H. C. Pitcher

Kellogg Appoints Pitcher

H. C. Pitcher has been named construction manager of The M. W. Kellogg Co. He will be in charge of all Canadian and South American construction for Kellogg subsidiaries: The Canadian Kellogg Co. Ltd., Toronto, and Kellogg Pan-American Corp., New York. He will also be in charge of construction activities of M. W. Kellogg's Fabricated Products Division.

Mr. Pitcher joined Kellogg in 1935. He was a residential manager of construction at power plants, refineries, and chemical plants from 1940 to 1947, and was placed in charge of construction for the Fabricated Products Division in 1948. He was made manager of USA construction in 1953. He left Kellogg to become general manager of Graver Construction Co., from 1955 to 1957, and rejoined Kellogg to take up his present position.

Stanvac Suspends Indonesian Exploration

Standard-Vacuum Oil Co. has suspended oil exploration in Sumatra because of its inability to obtain permission from the Indonesian government to explore and develop new concession areas. Fifteen Indonesian employees in the company's exploration division in Sumatra were laid off on December 1, and more were laid off January 1. Stanvac's coordinator of exploration and producing activities, H. A. Gibbon confirmed reports that Stanvac is withdrawing some of its overseas exploration specialists—mainly American geologists and geophysicists—from Indonesia and sending them to other Asian areas such as India and Pakistan where the company has undertaken major, exploration efforts. The company's last geophysical party in Sumatra completed its mission in October.

"We have looked and looked in our old concession areas, and evaluated our geological and geophysical data, and find these areas of no further interest," Mr. Gibbon said. He recalled that as long ago as 1948 it became evident that production from Stanvac's fields in South Sumatra would soon begin to decline, and that the relatively small crude-oil sources to be developed in Central Sumatra would compensate for this decline only temporarily. In that year the company realized it would have to intensify its search for new oil reserves in the areas allotted to it, and at the same time applied to the Indonesian government for rights to explore and develop new areas.

"We have had applications in for almost ten years," said Mr. Gibbons, "but permission has not been granted. Since we have not yet received new exploration and development areas, we have no choice at this point but to send our exploration teams to other countries where they will have to do. These technical crews are costly, and we have to keep them busy."

Suspension of Standard-Vacuum's exploration activities in Sumatra does not at the present time affect the company's producing, refining, tanker, and marketing operations in Indonesia. In October the company dedicated the first "cat cracker" unit in Southeast Asia for producing high-octane gasoline at its refinery near Palembang. This unit was part of an $80 million expansion program begun by Stanvac in Indonesia in 1954.

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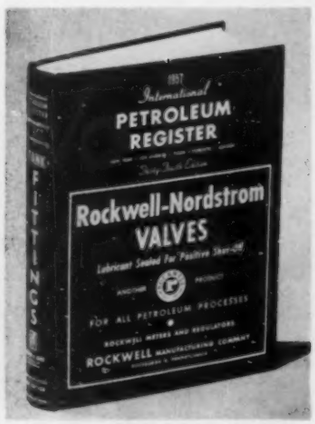

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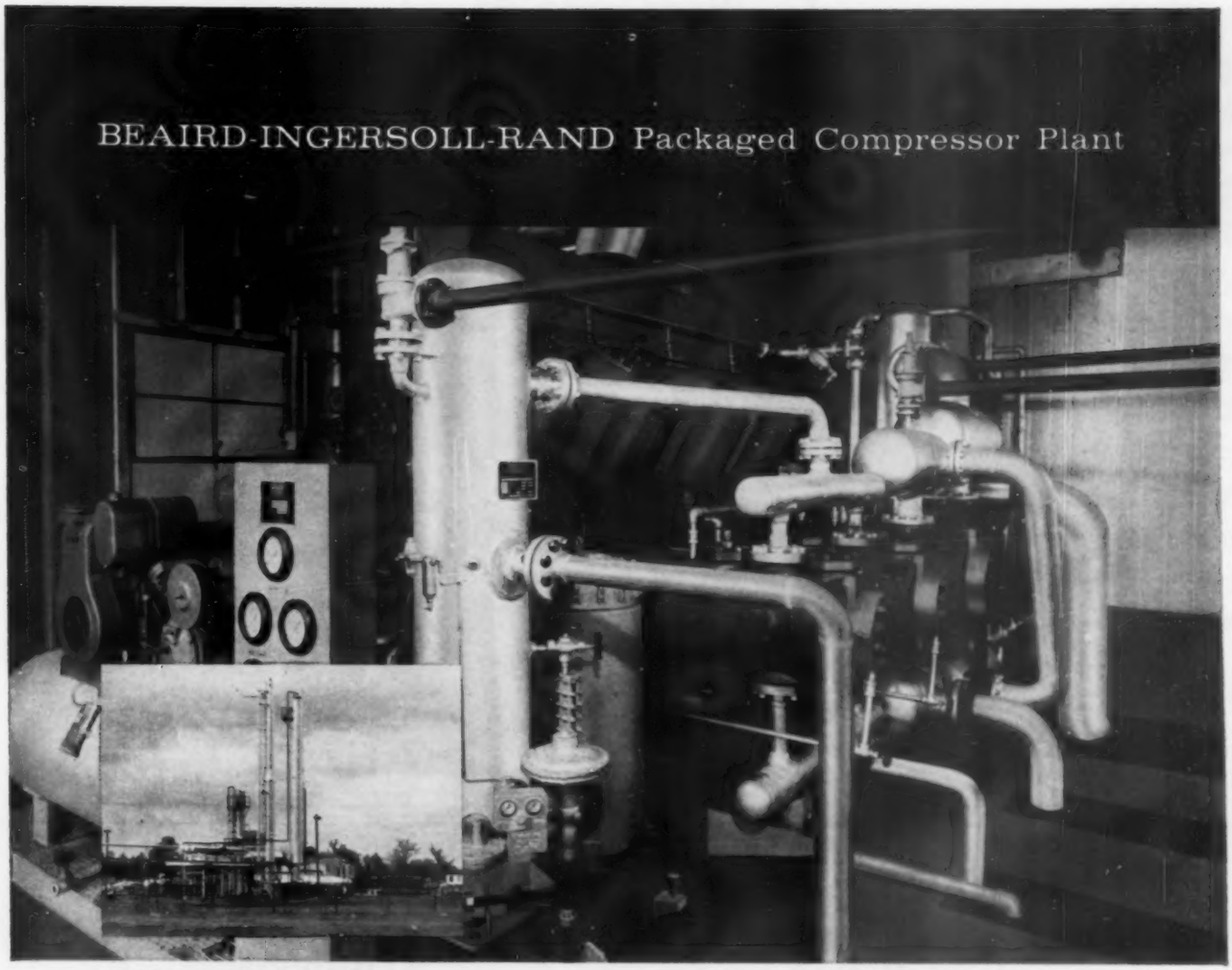

Jones-O'Brien, Inc. North Keatchie Gas Separation facility equipped with a Beaird-Ingersoll-Rand 440 h.p. 8SVG packaged compressor. Unit has radiator with lubricating oil cooler and updraft air turning duct. Semi-automatic operation has been achieved by equipping unit with speed and pressure regulators and shutdown devices. Other sizes from 120 to 660 h.p.

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Jones-O'Brien, Inc. has redesigned its North and South Keatchie gas separation facility to increase efficiency and convert to profits 2,200,000 cubic feet of gas being flared daily.

Both facilities have now been equipped with Beaird-Ingersoll-Rand packaged compressors. At the north facility an 8SVG 440 h.p. unit has been set up to perform a dual task. Two cylinders are compressing propane used as a refrigerant in the extraction process and two cylinders are boosting low pressure gas up to sales line pressure. The unit is set to supply 2.68 mmcfd of 200 psi propane from an input of 10 psi. The other two cylinders will boost 1.1 mmcfd of natural gas from 200 psi to 1,150 psi.

A 330 h.p. Beaird compressor at the South facility is boosting 1.2 mmcfd of natural gas to the sales line. Both units have been designed for semi-automatic operation. Engines are equipped with speed and pressure regulators that permit them to speed up and slow down to maintain a constant suction pressure. Other controls and shutdown devices protect the units from unforeseen changes in operating conditions.

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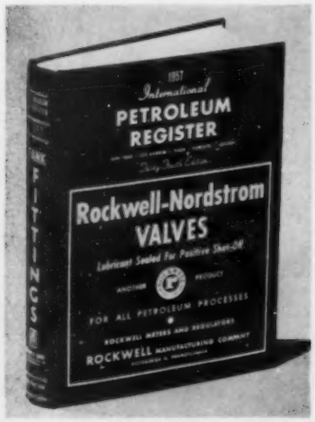

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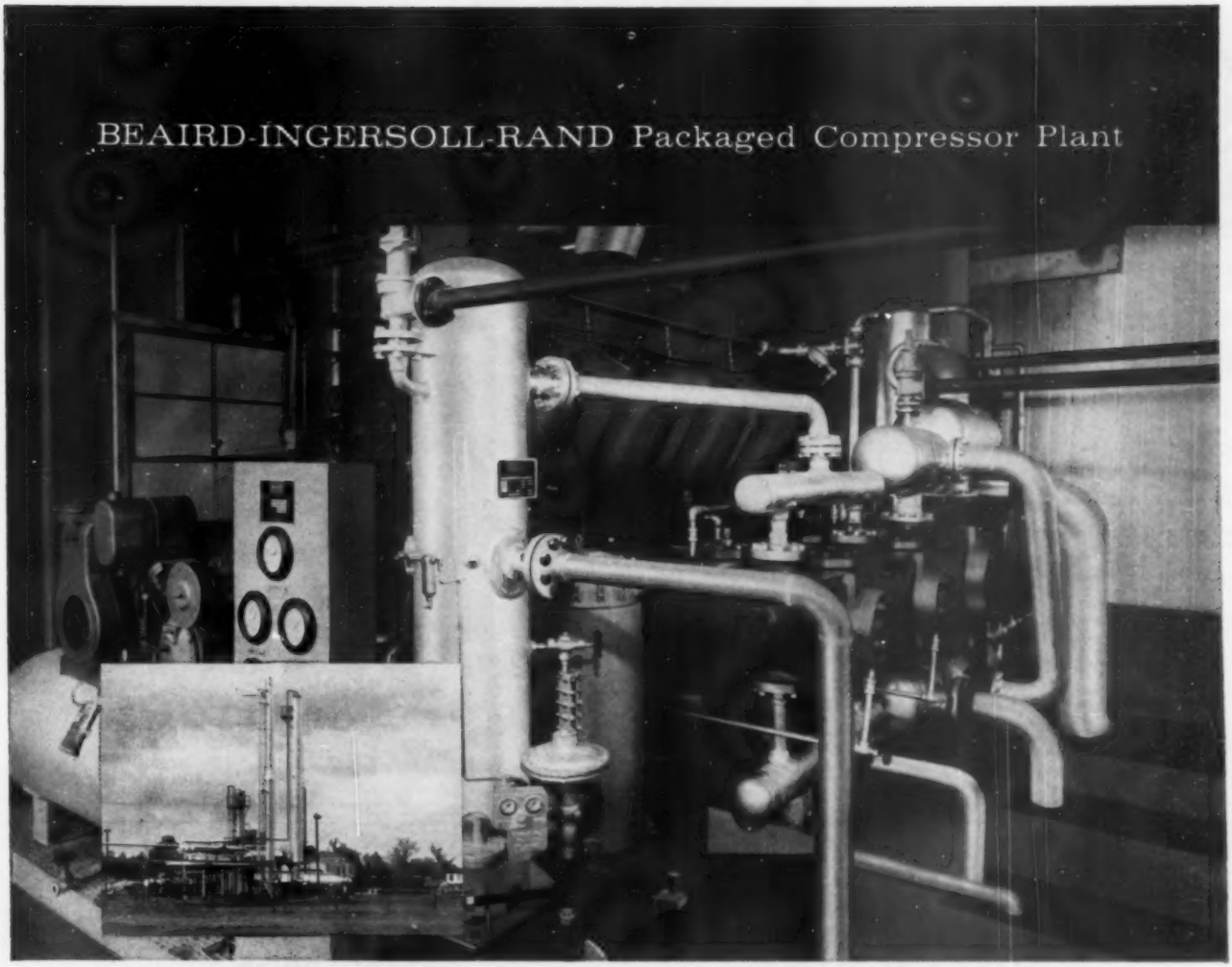

Jones-O'Brien, Inc. North Keatchie Gas Separation facility equipped with a Beaird-Ingersoll-Rand 440 h.p. 8SVG packaged compressor. Unit has radiator with lubricating oil cooler and updraft air turning duct. Semi-automatic operation has been achieved by equipping unit with speed and pressure regulators and shutdown devices. Other sizes from 120 to 660 h.p.

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Both facilities have now been equipped with Beaird-Ingersoll-Rand packaged compressors. At the north facility an 8SVG 440 h.p. unit has been set up to perform a dual task. Two cylinders are compressing propane used as a refrigerant in the extraction process and two cylinders are boosting low pressure gas up to sales line pressure. The unit is set to supply 2.68 mmcfd of 200 psi propane from an input of 10 psi. The other two cylinders will boost 1.1 mmcfd of natural gas from 200 psi to 1,150 psi.

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Optimum investment and operating costs are assured through designs that utilize selectively lower pressures, reduce the use of costly alloys such as 18-8, and lower the consumption of high pressure hydrogen.

Kellogg desulfurization units can be engineered to treat virgin streams of naphtha, kerosene, gas oil and other fuels, and cracked stocks of similar boiling ranges. Or units can be designed to operate simultaneously on streams from the topping and cracking units. Where desired, the design can include equipment to recover the sulfur as a salable by-product. Your inquiries will receive prompt attention.

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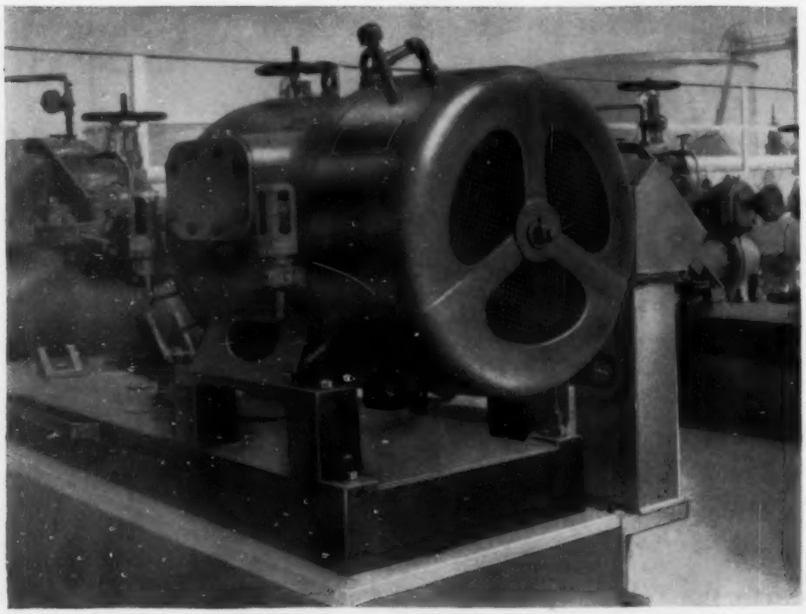
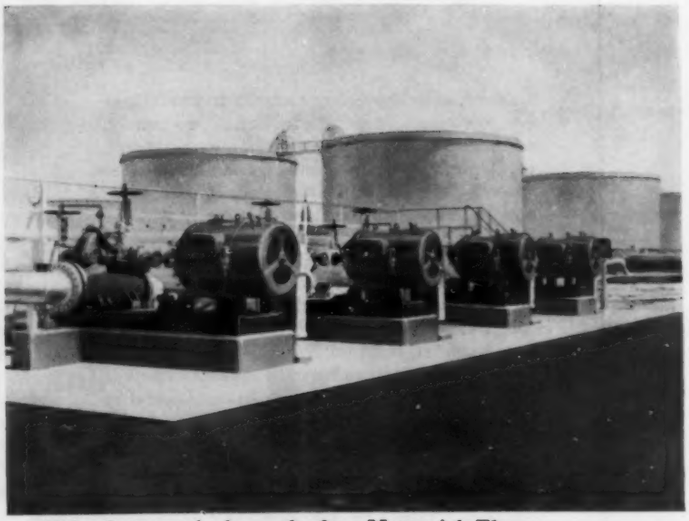
Flameproof Motors for the Oil Industry



A. Metrovick 250 h. p. 1480 r. p. m. Flameproof Squirrel Cage Motor—one of four supplied to the Kwinana Oil Refinery

Oil wells and refineries throughout the world rely on M-V equipment. Metrovick experience of motors and their proper application covers all drives in the oil industry, from drilling to refining. Some of the refineries using Metrovick motors are the Grangemouth Petroleum Refinery, Ltd., Shell Stanlow Refinery, Esso Refinery, Fawley, Trinidad Leaseholds Point-a-Pierre Refinery, B.W.I., and (illustrated) British Petroleum Company's Refinery at Kwinana, Australia.

Special arrangements were put in hand to guarantee that these motors were delivered to meet site requirements.



This photograph shows the four Metrovick Flameproof Motors driving kerosene pumps at Tank Farm Pumping Station No. 3. These motors are fitted with constant-level oil lubricators.

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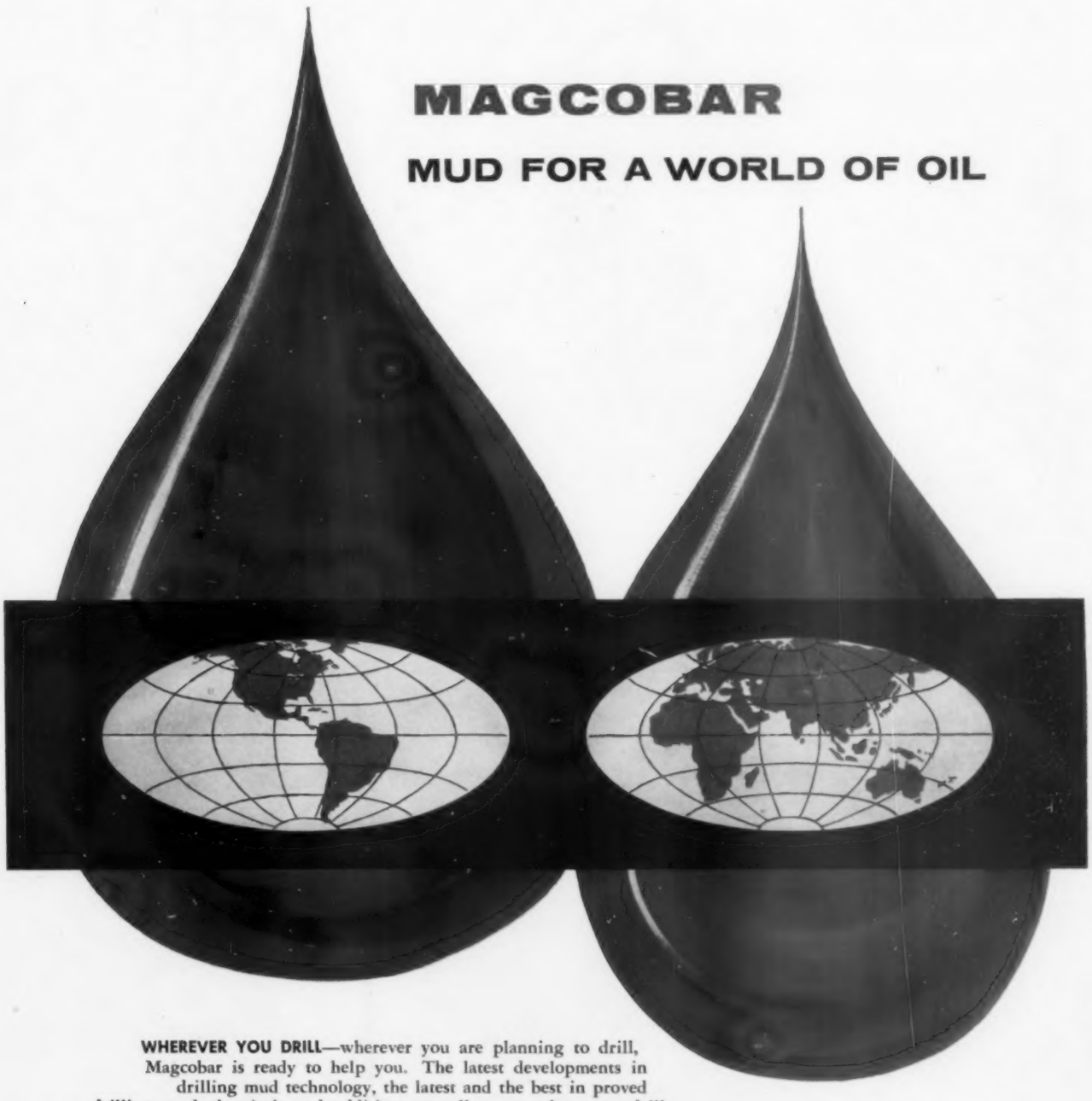

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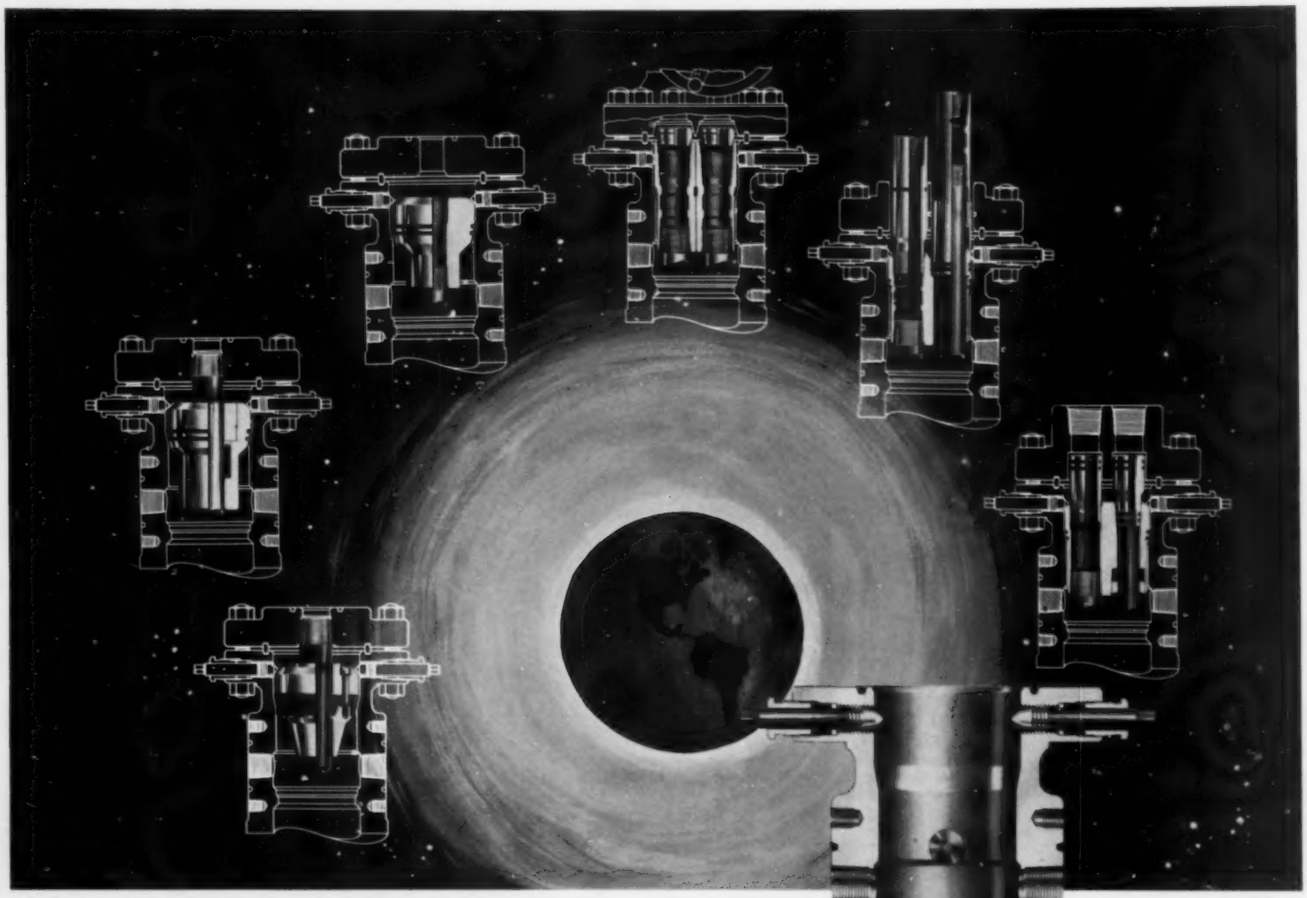

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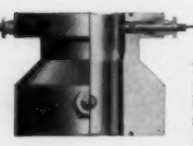

This "UA" attachment adapts conventional A.P.I. Tubing Heads so they may be used with any dual string and single string "U" Hangers. A saving can be realized because the attachments cost less than the Universal Tubing Head.

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